Summary of the 2005 British Columbia Sablefish (*Anoplopoma fimbria*) Research and Assessment Survey

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by

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TABLE OF CONTENTS

TABLE OF CONTENTS III

LIST OF TABLES V

LIST OF FIGURES VII

ABSTRACT IX

RÉSUMÉ X

1.0 INTRODUCTION 1

2.0 METHODS 2

2.1 Survey Vessels 2
2.2 Traditional Survey 3
2.2.1 Localities *3*
2.2.2 Depth Intervals *3*
2.3 Stratified Random Sampling Survey 4
2.4 Fishing Gear and Operations 5
2.5 Escape ring experiment design 5
2.6 Catch and Effort Data Collection 6
2.7 Catch Processing 6
2.7.1 Biological Samples *6*
2.7.2 Recovered Tagged Sablefish *7*
2.7.3 Tagging Procedures *7*
2.7.4 Standardized Sets At Offshore Indexing Localities *8*
2.7.5 Standardized Sets At Mainland Inlet Localities *8*
2.7.6 Type 1 Tagging Sets *8*
2.7.7 Escape Ring Experiment *9*
2.7.8 Type 3 Tagging Sets *10*
2.8 Oceanographic Sampling 10

3.0 RESULTS AND DISCUSSION 10

3.1 Catch Rates 10
3.2 Catch Composition 12
3.3 Sablefish Sampling and Tagging 13
3.4 Escape ring experiment results 14

4.0 ACKNOWLEDGEMENTS 17

5.0 REFERENCES 18

APPENDIX A DETAILS OF SETS COMPLETED DURING THE 2005 STANDARDIZED CHARTER (F/V PACIFIC VIKING) 59

APPENDIX B DETAILS OF SETS COMPLETED DURING THE 2005 TAGGING CHARTER (F/V VIKING SUNRISE) 62

APPENDIX C EXAMPLE DATA FORMS 66

APPENDIX D CHARTER VESSEL DECK DIAGRAMS 75

APPENDIX E SABLEFISH GONAD MATURITY STAGES 77

APPENDIX F SUMMARY OF TRAP USE DURING THE 2005 STANDARDIZED CHARTER (F/V PACIFIC VIKING) 78

APPENDIX G SUMMARY OF TRAP USE DURING THE 2005 TAGGING CHARTER (F/V MILBANKE SOUND) TYPE 3 TAGGING SETS 82

APPENDIX H SUMMARY OF TRAP USE DURING THE 2005 TAGGING CHARTER (F/V MILBANKE SOUND) TYPE 1 TAGGING SETS 86

APPENDIX I DETAILS ON SABLEFISH CATCH AND NUMBERS RECOVERED, SAMPLED AND TAGGED DURING THE 2005 STANDARDIZED CHARTER (F/V PACIFIC VIKING) 89

APPENDIX J DETAILS ON SABLEFISH CATCH AND NUMBERS RECOVERED, SAMPLED AND TAGGED DURING THE 2005 TAGGING CHARTER (F/V VIKING SUNRISE). 92

APPENDIX K. ESCAPE RING STUDY DETAILS 95

APPENDIX L TRAP GEAR GLOSSARY 104

LIST OF TABLES

TABLE 1. SUMMARY OF SETS CONDUCTED DURING THE 2005 SABLEFISH RESEARCH AND ASSESSMENT SURVEY. BIOSAMPLING CODES CORRESPOND TO LENGTH (L), SEX (S), WEIGHT (W), MATURITY (M), AND EXCISION OF OTOLITHS (O) FOR AGEING. 19

TABLE 2. BRITISH COLUMBIA SABLEFISH RESEARCH AND ASSESSMENT SURVEYS, 1988 TO 2005. ..20

TABLE 3. GEOGRAPHIC BOUNDARIES OF THE TRADITIONAL SABLEFISH SURVEY OFFSHORE LOCALITIES. 21

TABLE 4. GEOGRAPHIC BOUNDARIES OF THE SET LOCATIONS WITHIN EACH MAINLAND INLET LOCALITY. EACH SET LOCATION WAS DEFINED AS THE AREA ENCLOSED BY THE POLYGON WITH VERTICES AT EACH OF THE FOUR OR FIVE INDICATED POINTS. 22

TABLE 5. LOCALITIES VISITED DURING SABLEFISH RESEARCH AND ASSESSMENT SURVEYS FROM 1994 THROUGH 2005 SHOWING THE NUMBER OF STANDARDIZED (S) AND TAGGING (T) SETS COMPLETED AT EACH LOCALITY. FOR SIMPLICITY, SURVEYS CONDUCTED PRIOR TO 1994 AND THE SPRING TAGGING SURVEYS CONDUCTED IN 1996 AND 1997 ARE NOT SHOWN (FOR DETAILS ON THESE SURVEYS, SEE WYETH AND KRONLUND 2003). LOCALITIES THAT ARE NO LONGER VISITED ARE SHOWN IN *ITALICS*. 23

TABLE 6. SABLEFISH RESEARCH AND ASSESSMENT SURVEY DEPTH INTERVALS. 25

TABLE 7. SUMMARY OF THE STRATIFIED RANDOM SAMPLING SURVEY STRATA. THE AREA (KM^2) OF EACH SPATIAL (S_i) AND DEPTH (RD_j) STRATUM COMBINATION IS INDICATED, WITH THE NUMBER OF POSSIBLE 2 KM BY 2 KM SAMPLING UNITS PER STRATUM IN PARENTHESES (). 25

TABLE 8. SUMMARY OF ESCAPE RING STUDY TREATMENTS. 26

TABLE 9. UTILIZATION OF SABLEFISH CAUGHT ON ESCAPE RING STUDY SETS. 27

TABLE 10. SUMMARY OF SPECIES CAPTURED DURING THE 2005 SURVEY STANDARDIZED SETS CONDUCTED AT OFFSHORE INDEXING LOCALITIES. NO VALUE IN THE COUNT OR WEIGHT COLUMNS INDICATES THAT THE CATCH WAS NOT COUNTED OR WEIGHED, RESPECTIVELY. TRACE INDICATES A TOTAL WEIGHT OF LESS THAN 1 KG. 28

TABLE 11. SUMMARY OF SPECIES CAPTURED DURING THE 2005 SURVEY STANDARDIZED SETS CONDUCTED AT MAINLAND INLET LOCALITIES. NO VALUE IN THE COUNT OR WEIGHT COLUMNS INDICATES THAT THE CATCH WAS NOT COUNTED OR WEIGHED, RESPECTIVELY. TRACE INDICATES A TOTAL WEIGHT OF LESS THAN 1 KG. 30

TABLE 12. SUMMARY OF SPECIES CAPTURED DURING THE 2005 SURVEY TYPE 1 TAGGING SETS CONDUCTED AT OFFSHORE INDEXING AND OFFSHORE TAGGING LOCALITIES. NO VALUE IN THE COUNT OR WEIGHT COLUMNS INDICATES THAT THE CATCH WAS NOT COUNTED OR WEIGHED, RESPECTIVELY. TRACE INDICATES A TOTAL WEIGHT OF LESS THAN 1 KG. 31

TABLE 13. SUMMARY OF SPECIES CAPTURED DURING THE 2005 SURVEY TYPE 3 TAGGING SETS (STRS SURVEY). NO VALUE IN THE COUNT OR WEIGHT COLUMNS INDICATES THAT THE CATCH WAS NOT COUNTED OR WEIGHED, RESPECTIVELY. TRACE INDICATES A TOTAL WEIGHT OF LESS THAN 1 KG. 32

TABLE 14. SUMMARY OF THE NUMBER OF SABLEFISH RECOVERED, TAGGED, AND SAMPLED DURING THE TRADITIONAL COMPONENT OF THE 2005 SURVEY. 34

TABLE 15. SUMMARY OF SABLEFISH RECOVERED, TAGGED, AND SAMPLED DURING THE STRATIFIED RANDOM DESIGN COMPONENT OF THE 2005 SURVEY. 35

TABLE 16. SUMMARY OF BIOLOGICAL DATA COLLECTED DURING THE 2005 TRADITIONAL SURVEY EXCLUDING RECOVERED TAGGED FISH. 36

TABLE 17. SUMMARY OF BIOLOGICAL DATA COLLECTED DURING THE 2005 RANDOM SURVEY EXCLUDING RECOVERED TAGGED FISH. 37

TABLE 18. SUMMARY OF SABLEFISH CATCH RATES BY ESCAPE RING STUDY TREATMENT. THE AVERAGE NUMBER AND WEIGHT (KG) PER TRAP ARE SHOWN BY SET AND TREATMENT. CATCH RATES WERE INCLUDED IN THE SUMMARY ONLY FOR THOSE TRAPS THAT WERE FISHING CORRECTLY. 38

TABLE 19. MIXED EFFECTS LINEAR MODEL RESULTS FOR THE ESCAPE RING EXPERIMENT. THE OVERALL F-STATISTIC FOR THE FIXED TREATMENT EFFECT, ESTIMATED VARIANCES, AND TREATMENT CONTRASTS RELATIVE TO TREATMENT LEVEL E3 (STEEL 3 $^{1}/_{2}$ INCH RING) ARE LISTED. 39

TABLE 20. SUMMARY OF SABLEFISH BIOLOGICAL SAMPLING FROM ESCAPE RING TREATMENT TRAPS DURING TYPE 1 TAGGING SETS DURING THE 2005 SURVEY. THE NUMBER OF SABLEFISH SAMPLED AND THE SEX RATIO (PERCENT MALES) IS SHOWN BY TREATMENT AND SET NUMBER. 40

TABLE 21. SUMMARY OF BIOLOGICAL DATA COLLECTED FROM SABLEFISH FROM ESCAPE RING TREATMENT TRAPS DURING TYPE 1 TAGGING SETS. THE AVERAGE FORK LENGTH AND GIRTH IN MM IS SHOWN BY TREATMENT AND SET NUMBER 41

TABLE 22. SUMMARY OF THE NUMBER OF TRAPS WITH SABLEFISH STUCK IN THE ESCAPE RINGS BY TREATMENT AND SET. TREATMENTS ARE ARRANGED IN ROWS AND EACH COLUMN IS A SET. EACH CELL SHOWS THE NUMBER OF TRAPS WITHOUT A FISH IN THE ESCAPE RINGS FOLLOWED BY THE NUMBER OF TRAPS WITH A FISH IN ONE OF THE ESCAPE RINGS IN PARENTHESES. 41

LIST OF FIGURES

FIGURE 1. GEOGRAPHIC BOUNDARIES OF THE TRADITIONAL SURVEY LOCALITIES. BLUE BOXES INDICATE AN INDEXING LOCALITY, TAGGING LOCALITIES ARE INDICATED BY RED BOXES AND GREEN BOXES INDICATE THE LOCATIONS WITHIN THE MAINLAND INLET LOCALITIES. THE 1000 M DEPTH CONTOUR IS SHOWN. 42

FIGURE 2. LOCATIONS OF NORTH COAST SETS COMPLETED DURING THE 2005 SURVEY. BLUE LINES REPRESENT STANDARDIZED SURVEY SETS, RED LINES REPRESENT TYPE 1 TAGGING SETS, AND GREEN LINES REPRESENT THE ACHIEVED LOCATIONS OF THE STRS SETS. THE GREY SQUARES INDICATE THE 2 KM BY 2 KM SAMPLING UNITS SELECTED FOR THE STRS SURVEY AND THE DEGREE OF SHADING INDICATES THE TARGET DEPTH STRATUM. THE 1000 M CONTOUR IS SHOWN. 43

FIGURE 3. LOCATIONS OF CENTRAL COAST SETS COMPLETED DURING THE 2005 SURVEY. BLUE LINES REPRESENT STANDARDIZED SURVEY SETS, RED LINES REPRESENT TYPE 1 TAGGING SETS, AND GREEN LINES REPRESENT THE ACHIEVED LOCATIONS OF THE STRS SETS. THE GREY SQUARES INDICATE THE 2 KM BY 2 KM SAMPLING UNITS SELECTED FOR THE STRS SURVEY AND THE DEGREE OF SHADING INDICATES THE TARGET DEPTH STRATUM. THE 1000 M CONTOUR IS SHOWN. 44

FIGURE 4. LOCATIONS OF SOUTH COAST SETS COMPLETED DURING THE 2005 SURVEY. BLUE LINES REPRESENT STANDARDIZED SURVEY SETS, RED LINES REPRESENT TYPE 1 TAGGING SETS, AND GREEN LINES REPRESENT THE ACHIEVED LOCATIONS OF THE STRS SETS. THE GREY SQUARES INDICATE THE 2 KM BY 2 KM SAMPLING UNITS SELECTED FOR THE STRS SURVEY AND THE DEGREE OF SHADING INDICATES THE TARGET DEPTH STRATUM. THE 1000 M CONTOUR IS SHOWN. 45

FIGURE 5. SABLEFISH SURVEY MAINLAND INLET LOCALITIES. FIGURE PANELS SHOW PORTLAND INLET (TOP LEFT), GIL ISLAND (BOTTOM LEFT), FINLAYSON CHANNEL (TOP RIGHT) AND DEAN/BURKE CHANNEL (BOTTOM RIGHT). SETS CONDUCTED FROM 1994 TO 2004 ARE SHOWN IN BLACK WHILE THE 2005 SETS ARE SHOWN IN BLUE. THE GREEN POLYGONS INDICATE THE FIVE SPECIFIC SET LOCATIONS WITHIN EACH OF THE FOUR LOCALITIES. 46

FIGURE 6. THE STRATIFIED RANDOM SAMPLING SURVEY DESIGN. THE BOUNDARIES OF THE 5 SPATIAL STRATA (S_1-S_5) AND THE THREE DEPTH STRATA (RD_1-RD_3) ARE SHOWN. 47

FIGURE 7. DIAGRAMS OF FISHING GEAR USED DURING THE 2005 SABLEFISH SURVEY. THE LEFT PANEL SHOWS A MODIFIED KOREAN TRAP OF THE KIND USED FOR SURVEY FISHING. THE RIGHT PANEL SHOWS A DIAGRAMMATIC REPRESENTATION OF THE COMPONENTS OF A SET, OR STRING, OF TRAP GEAR. 48

FIGURE 8. ESCAPE RING EXPERIMENT TREATMENT LEVELS: E1 – STEEL RINGS CLOSED, E2 - $3\,^1/_2$ INCH (89 MM) STEEL RINGS, E3 - $3\,^1/_2$ INCH (89 MM) PLASTIC RINGS, AND E4 – $3\,^7/_8$ INCH (98 MM) STEEL RINGS. ALL DIMENSIONS INDICATE INSIDE RING DIAMETER. 49

FIGURE 9. BOXPLOTS OF THE ANNUAL DISTRIBUTIONS OF CATCH RATES FOR STANDARDIZED SETS CONDUCTED AT **OFFSHORE** INDEXING LOCALITIES, STANDARDIZED SETS CONDUCTED AT MAINLAND **INLET** LOCALITIES, AND TYPE 1 TAGGING SETS CONDUCTED AT BOTH OFFSHORE **TAGGING** AND INDEXING LOCALITIES. THE FILLED CIRCLES SHOW THE MEAN ANNUAL CATCH RATES. THE SHADED RECTANGLES INDICATE AN APPROXIMATE 95 PERCENT CONFIDENCE INTERVAL ON THE MEDIAN ANNUAL CATCH RATE. 50

FIGURE 10. DISTRIBUTION OF CATCH RATES FOR TYPE 3 TAGGING SETS SUMMARISED BY A BOXPLOT FOR EACH SPATIAL AND DEPTH STRATUM BY YEAR. THE PANELS ON THE LEFT SHOW CATCH RATES GROUPED BY SPATIAL STRATA FROM SOUTH TO NORTH (S_1-S_5). THE PANELS ON THE RIGHT SHOW CATCH RATES GROUPED BY DEPTH STRATA FROM SHALLOW TO DEEP (RD_1-RD_3). THE FILLED CIRCLES SHOW THE MEAN STRATUM CATCH RATES. THE SHADED RECTANGLES INDICATE AN APPROXIMATE 95 PERCENT CONFIDENCE INTERVAL ON THE MEDIAN CATCH RATE FOR THE STRATUM 51

FIGURE 11. DISTRIBUTION OF SABLEFISH TRAP CATCH RATES BY TREATMENT FOR ALL TRAPS (LEFT) AND SELECTED TRAPS (RIGHT). THE UPPER HISTOGRAMS SHOW CATCH RATES BY THE NUMBER OF FISH PER TRAP WHILE THE BOTTOM HISTOGRAMS SHOW WEIGHT (KG) PER TRAP 52

FIGURE 12. SABLEFISH TRAP CATCH RATES IN NUMBERS PER TRAP BY TREATMENT AND SET. ONLY SELECTED TRAPS ARE SHOWN. THE SOLID HORIZONTAL LINES INDICATE THE AVERAGE CATCH RATE FOR EACH TREATMENT 53

FIGURE 13. SABLEFISH LENGTH (MM) PLOTTED AGAINST GIRTH (MM) BY SEX AND ESCAPE RING TREATMENT LEVEL. BLUE CIRCLES REPRESENT MALE SABLEFISH WHILE PINK CIRCLES REPRESENT FEMALE SABLEFISH. 54

FIGURE 14. DISTRIBUTION OF SABLEFISH FORK LENGTHS (MM) AND GIRTHS (MM) BY ESCAPE RING TREATMENT OVER ALL SETS. THE SAMPLE SIZE IS LISTED BELOW EACH BOXPLOT. 55

FIGURE 15. AVERAGE SABLEFISH FORK LENGTH (MM) FOR THE ESCAPE RING EXPERIMENT BY SET AND TREATMENT LEVEL 56

FIGURE 16. AVERAGE SABLEFISH GIRTH (MM) FOR THE ESCAPE RING EXPERIMENT BY SET AND TREATMENT LEVEL. 57

ABSTRACT

Wyeth, M.R, Kronlund, A.R. and Elfert, M. 2007. Summary of the 2005 British Columbia sablefish (*Anoplopoma fimbria*) research and assessment survey. Can. Tech. Rep. Fish. Aquat. Sci. 2694: xi + 105 p.

This document summarizes the methodology and results of the 2005 British Columbia sablefish research and assessment survey. The 2005 survey continued the time series of annual fall surveys initiated in 1988 and standardized beginning in 1990. Longline trap fishing was conducted at selected offshore and mainland inlet localities. Survey tasks were divided between two chartered commercial fishing vessels.

The standardized charter vessel conducted sets at nine offshore indexing localities and five mainland inlet localities. These sets provide a catch rate based abundance index used for stock assessment. In addition, sablefish were tagged and released from the sets fished in the mainland inlet localities.

The tagging charter vessel conducted tagging sets at five offshore tagging localities and nine offshore indexing localities. These traditional tagging sets followed protocols used since 1995. Some of the traps fished during the traditional tagging sets were fitted with escape rings as part of an experiment intended to investigate the effect of escape rings on catch rates and the sizes of retained fish. The tagging charter vessel also conducted 74 sets following a stratified random sampling design comprised of five spatial and three depth strata.

There has been a general decline in the catch rates of standardized offshore sets over the past three years. However, the within-year variability of catch rates over this period has been much higher than in previous years. Whether expressed in terms of numbers per trap of weight per trap, the mean catch rate for the 2005 standardized offshore sets was comparable to those observed in 1994 and 1995. The 2005 catch rates for the mainland inlet standardized sets were also highly variable with a lower mean catch rate than that observed in 2004. In contrast, the catch rates achieved during traditional tagging sets showed lower variability and were equivalent to, or modestly increased from, those observed in 2004.

As with the traditional survey catch rates, there was a modest reduction in the overall catch rates for the 2005 stratified random survey sets when compared to results from 2004. The pattern of catch rates in 2005 among the random design depth strata was similar to that observed in 2004. High variability was observed in the shallow stratum, the highest catch rates in the middle stratum, and the lowest catch rates and associated low variability in the deep stratum.

Of the 28,366 sablefish captured during the 2005 survey, 10,728 were tagged and released, 184 previously tagged sablefish were recovered and re-released when viable, and 7,937 fish were sampled for biological data.

The results of the escape ring experiment indicate that traps with escape rings retained fewer fish than traps without escape rings. Further, the average size of fish retained in the traps was positively correlated with the size of the escape ring opening.

RÉSUMÉ

Wyeth, M.R, Kronlund, A.R., and Elfert, M. 2007. Summary of the 2005 British Columbia sablefish *(Anoplopoma fimbria)* research and assessment survey. Can. Tech. Rep. Fish. Aquat. Sci. 2694: xi + 105 p.

Ce document fait la synthèse des méthodes et des résultats du relevé de recherche et d'évaluation de la morue charbonnière de la Colombie-Britannique effectué en 2005 Ce relevé s'ajoute à la série chronologique des relevés d'automne annuels qui ont commencé en 1988 et ont été normalisés à partir de 1990. Le relevé a été effectué par deux bateaux de pêche commerciale affrétés et a consisté à pêcher la morue au moyen de casiers fixés à des lignes de fond dans des endroits choisis au large et dans des bras de mer continentaux.

Un des bateaux affrété a effectué la pêche indicatrice normalisée à neuf stations au large et à cinq stations dans des bras de mer continentaux pour obtenir un indice d'abondance fondé sur les taux de capture, à des fins d'évaluation des stocks. En outre, des morues capturées dans les bras de mer continentaux ont été marquées et libérées.

L'autre bateau affrété a servi à capturer des morues pour le marquage à cinq stations au large et à pratiquer la pêche indicatrice à neuf stations au large. Les mouillages de casiers ont été réalisés selon le protocole utilisé pour le marquage depuis 1995. Certains des casiers utilisés pour ces mouillages ont été munis d'anneaux de sortie en vue d'établir leur effet sur les taux de capture et la taille des morues capturées. Ce bateau a également effectué 74 mouillages de casiers selon un plan d'échantillonnage aléatoire stratifié de cinq strates spatiales et de trois strates de profondeur.

En général, les taux de capture pour les mouillages normalisés au large ont diminué au cours des trois dernières années. La variabilité au cours des années durant cette période est cependant beaucoup élevée que durant les années précédentes. Qu'il soit exprimé en nombre de morues par casier ou en poids par casier, le taux de capture moyen de 2005 pour les mouillages normalisés au large se compare aux taux de 1994 et 1995. Les taux de capture pour les mouillages normalisés dans les bras de mer continentaux étaient également hautement variables. Le taux de capture moyen était moins élevé qu'en 2004. Par contre, les taux de capture obtenus pour les mouillages de marquage variaient moins; ils étaient semblables ou légèrement plus élevés qu'en 2004.

Comme dans le cas des taux de capture pour les mouillages de pêche indicatrice au large, le taux de capture global pour les mouillages aléatoires stratifiés était légèrement moins élevé qu'en 2004. La trajectoire des taux de capture dans les strates échantillonnées aléatoirement se comparait à celle observée en 2004 : les plus variables ont été obtenus dans la strate peu profonde, les plus élevés dans la strate centrale et les plus faibles, variables également, dans la strate profonde.

Des 28 366 morues charbonnières capturées, 10 728 ont été marquées et relâchées, 184 morues charbonnières marquées lors d'années antérieures ont été recapturées et relâchées lorsque vivantes, et 7 937 ont été échantillonnées pour obtenir des données biologiques.

Moins de morues étaient présentes dans les casiers munis d'anneaux de sortie que dans les casiers intacts. La taille moyenne de ces morues était en corrélation positive avec le diamètre des anneaux.

1.0 INTRODUCTION

Sablefish (*Anoplopoma fimbria*) are an abundant and commercially valuable species throughout their range in the North Pacific. They have a long history of exploitation in Canadian waters with landings reported as early as 1900 (McFarlane and Beamish 1983). British Columbia fishermen harvest sablefish with longline trap, longline hook, and trawl gear along the continental shelf at depths up to 1800 m. The British Columbia sablefish fishery landed an average of approximately 3700 metric tons annually for the period 1995 to 2005. The majority (>75%) of the fish were captured using trap gear.

In 1988 an annual research and assessment survey of sablefish along the British Columbia coast was initiated. An overview of how the annual sablefish survey has expanded and changed over the years was provided by Wyeth and Kronlund (2003) and Wyeth et al. (2004b). For specific details on surveys conducted from 1988 through 1993, see Smith et al. (1996); for surveys in 1994 and 1995 see Downes et al. (1997); for surveys from 1996 to 2000 see Wyeth and Kronlund (2003), and for the 2001 through 2004 surveys see Wyeth et al. (2003, 2004a, 2004b, and 2006 respectively). Each year, fishing was conducted at selected localities using trap gear consistent with the commercial fishery. The fishing protocol was refined over the first few years of the survey and was standardized beginning in 1990. These standardized sets were intended to track trends in abundance and biological characteristics at the survey localities. Sablefish from standardized sets were tagged and released beginning in 1991. In 1994, sets with the sole purpose of capturing sablefish for tag and release were added at the existing localities. In 1995, additional localities were added to the survey specifically for tagging sets. These localities are referred to as tagging localities while the initial survey localities are referred to as indexing localities. A pilot stratified random sampling design was introduced for the 2003 survey with the dual purposes of random release of tagged fish and the development of a second stock abundance index.

The 2005 sablefish research and assessment survey was comprised of two main components. First, the existing 1990 to 2004 standardized survey time series was continued for 2005 and followed the established protocols for fishing gear, catch monitoring, biological sampling, and tagging. Standardized sets were conducted at nine offshore indexing localities and five mainland inlet localities. Tagging sets were conducted at nine offshore indexing localities and at five offshore tagging localities. Second, the stratified random sampling design initiated in 2003 was re-randomized and repeated in 2005 with a total of 74 sets conducted in five spatial strata and three depth strata.

In addition to the standard biological sampling and tagging protocols of the traditional tagging sets, an experiment to examine the effects of escape rings in traps was combined with the existing traditional tagging sets. Though escape rings are normally sewn shut for survey sets, specific traps during each traditional tagging set were fitted with circular escape rings to investigate how different sized rings affected both sablefish catch rates and the size frequency of retained sablefish.

This document summarises the methods and results of the 2005 survey program and consists of a main body of text with supporting appendices. Tables and figures referred to in the

main text are sequentially numbered. Tables and figures in the appendices are labelled with the letter code of the appendix and a sequential number, e.g., Table A.2 for the second table in Appendix A.

2.0 METHODS

The 2005 sablefish research and assessment survey included both a traditional component and a stratified random sampling design component. Table 1 summarizes the survey components, charters, locations, and set types completed during the 2005 survey. The traditional component followed protocols that have evolved over the 17 year life of the annual survey. Fishing was conducted at selected offshore and mainland inlet localities along the British Columbia coast. The offshore localities can be split into indexing localities and tagging localities based on the history of this survey. Two types of sets were fished as part of the traditional component of the 2005 survey: (1) standardized sets with rigorous gear specifications that were used to collect catch rate data intended to index trends in abundance and to obtain fish for biological sampling, and (2) tagging sets with less rigorous gear requirements that were designed to capture sablefish for tag and release. The protocol for standardized sets evolved over the first few years of the time series and beginning in 1990 they were conducted annually using a consistent protocol. In contrast, practices for tagging sets were variable prior to 1996, but specifications introduced in 1996 have been used consistently through to the 2005 survey. For the traditional component of the 2005 survey, standardized sets were made at offshore indexing and mainland inlet localities while tagging sets were made at offshore indexing and offshore tagging localities.

The second component of the 2005 survey employed a stratified random sampling (StRS) design (Table 1). The objectives of the StRS design are to distribute tag releases at random over the survey area and to develop a catch-rate based index of stock abundance as an alternative, and possible successor, to the standardized protocol described above. The StRS design was piloted in 2003 and repeated in 2004 and 2005. The StRS design allocated a total of 75 sets to five spatial and three depth strata, with five replicates for each combination of area and depth.

2.1 SURVEY VESSELS

Survey tasks in 2005 were split between two chartered vessels. The F/V Pacific Viking conducted the "standardized charter" which consisted of standardized sets at offshore indexing localities and at mainland inlet localities (Table 1). The F/V Viking Sunrise conducted the "tagging charter" which included traditional tagging sets in offshore indexing and offshore tagging localities as well as the StRS design sets (Table 1).

The F/V Pacific Viking, skippered by Albert Melnychuk, completed a total of 84 sets from October 4 to November 2, 2005 (Table 2). Detailed information for each set is listed in Appendix A. The F/V Viking Sunrise, skippered by Rory Johnson, completed a total of 88 sets from October 7 to November 17, 2005 (Table 2). Detailed information for each set is listed in Appendix B.

2.2 TRADITIONAL SURVEY

2.2.1 Localities

Skippers were directed to make sets within the geographic boundaries of the traditional survey localities (Figure 1, Table 3, and Table 4).

2.2.1.1 Offshore Indexing Localities

Nine offshore indexing localities were visited in 2005 (Table 5, Figure 1 through Figure 4). From north to south they were Langara Island-North Frederick, Hippa Island, Buck Point, Gowgaia Bay, Cape St. James, Triangle Island, Quatsino Sound, Esperanza Inlet, and Barkley Canyon.

2.2.1.2 Offshore Tagging Localities

Five offshore tagging localities were visited including Tasu Sound, Middle Ground, Pisces Canyon, Estevan Point, and Father Charles Canyon. The Rennell Sound tagging locality that was visited during surveys from 1996 to 2004 overlaps almost completely with the Hippa Island indexing locality (Wyeth et al. 2006). Furthermore, the set designated for Rennell Sound was often adjacent to the set designated for Hippa Island (Wyeth et al. 2006). Due to this overlap, the Rennell Sound locality was dropped for the 2005 survey.

2.2.1.3 Mainland Inlet Localities

Four mainland inlet localities were visited in 2005. From north to south they were Portland Inlet, Gil Island, Finlayson Channel, and Dean/Burke Channel (Table 5, Figure 1). Prior to 2002, the skippers were directed to make five sets in each inlet locality but set locations were not specified. Nonetheless, there was a fair degree of consistency in the spatial distribution of the set locations within each inlet among years. In 2002, five locations were chosen within each inlet locality to ensure consistency with the positions of sets conducted in previous years. The locations were described to the charter skipper in 2002 but no geographic limits were supplied (Wyeth et al. 2004). Beginning in 2003, the skipper was again directed to make one set in each of the five locations within an inlet, and the geographic boundaries of the locations were specified (Figure 5, Table 4).

2.2.2 Depth Intervals

Within the offshore localities, the skipper had discretion over the exact location of all sets, provided the sets were made in the specified depth intervals (Table 6). One standardized set was made in each of the following seven depth intervals at each offshore indexing locality in 2005 (D0 to D6, respectively): 91-274 m (50-150 fm), 274-457 m (150-249 fm), 457-641 m (250-349 fm), 641-824 m (350-449 fm), 824-1006 m (450-549 fm), 1006-1189 m (550-649 fm), and 1189-1389 m (650-749 fm). Only five depth intervals (D1-D5) were fished at each of the indexing localities at the outset of the time-series in 1990. From 1999 to 2001 these core intervals were supplemented with additional deep depth intervals at selected indexing localities and at other locations (Wyeth et al. 2004). In 2002, two deep depth intervals (D6-D7) were defined and corresponding deep sets were made at each indexing locality. Beginning in 2003 and continuing in 2005, the deepest depth interval (D7, 1372-1827 m, 750-999 fm) was only fished at the Barkley Canyon locality while a shallow depth interval (D0) was fished at all localities.

Most sablefish tagged and released from offshore areas since 1995 were captured during traditional (Type 1) tagging sets. In order to maintain continuity with historical tagging practices, the 2005 survey included Type 1 tagging sets targeted at depths of 457-824 m (250-450 fm) where the highest catch rates were expected (Table 6). A single Type 1 tagging set was fished at each of the five offshore tagging localities and at each of the nine offshore indexing localities.

The depth of sets at the mainland inlet localities was determined by the bathymetry of each individual set location (Table 6). Fishing within specific depth intervals was not possible because of the steep-sided bathymetry of the inlets. One set was made in each of the locations defined in Table 4 (Figure 5) for a total of five sets in each of the four inlet localities.

2.3 STRATIFIED RANDOM SAMPLING SURVEY

The stratified random sampling (StRS) design component of the survey followed the same sampling design, gear specifications and fishing methods established in 2003. The survey was conducted in the offshore area of the British Columbia coast. Five spatial strata and three depth strata were used to partition the survey area (Table 7, Figure 6). Canadian Hydrographic Service natural resource maps of coastal British Columbia were used to define the depth strata. Three depth strata (Table 7) were selected to demarcate the shallow (183-457 m, 100-250 fm), main (457-824 m, 250-450 fm), and deep (824-1372 m, 450-750 fm) depth ranges of the commercial trap fishery. Note that typographical errors in the 2003 survey report (Wyeth et al. 2004b) incorrectly specified the upper limit of the shallow depth interval as 91 m (50 fm) rather than 183 m (100 fm). The StRS design spatial strata boundaries were determined by examining large scale bathymetric features, spatial patterns of commercial trap fishing effort, and the relative areas of the spatial strata (Figure 6, Table 7). Based on the resolution of the bathymetry data and the estimated length of a string of 25 traps (approximately 1200 m), a 2 km by 2 km grid was used to define a set of possible sampling units in the survey area. Each sampling unit within the 15 strata was assigned a unique identification number. Five sampling units were randomly selected from all possible 2 km by 2 km units within each of the 15 combinations of spatial and depth strata. This selection provided a total of 75 sets (Figure 2 through Figure 4). However, in 2005 one of the randomly selected units for the northern area and shallow depth strata was not fished to avoid extending an already weather-delayed survey by an additional day.

One StRS design set (or Type 3 tagging set) was made at each selected sampling unit. The charter skipper was directed to set as much of the gear as possible within each selected 2 km by 2 km block providing the actual bottom depth at the set location was within the specified depth strata. The accuracy and resolution of the bathymetry data used to identify the depth stratum of each block is limited in some areas. Thus, it is possible that upon visiting a selected block, the specified depth range of that block may not be found. If such a situation is encountered, or if the bottom relief precluded fishing, the skipper was directed to make the set in an adjacent sampling unit. Specifically, the set was to be deployed in the sampling unit directly to the east or west of the selected sampling unit. If those alternatives proved unworkable, sampling units to the north and south of the intended sampling unit were to be attempted.

2.4 FISHING GEAR AND OPERATIONS

The fishing gear and operations used in 2005 were consistent with the protocol of surveys from 1990 onwards (Wyeth and Kronlund 2003). All sets were made using each charter vessel's longline trap gear which was typical of that employed in the commercial sablefish trap fishery. See Wyeth and Kronlund (2003) and Appendix L for a more detailed description of the survey fishing gear and setting and hauling procedures. Briefly, a set or "string" of longline trap gear consisted of a line resting on the ocean floor (groundline) with baited traps attached at 46 m (25 fathom) intervals along its length (Figure 7). The groundline was secured to the ocean floor by anchors at each end and the location of the string was marked by floats attached to the groundline by anchorlines.

The F/V Pacific Viking and the F/V Viking Sunrise both used traps with black web and two stainless steel escape rings with internal diameters of 98 mm ($3\ ^{7}/_{8}$ inch). Each escape ring had orange twine laced across the opening.

Standardized sets were fished with strings of 25 traps, each trap baited with approximately 1 kg of frozen squid in a bait bag. Both Type 1 and Type 2 tagging sets were baited with a combination of a 1 kg block of frozen squid in a bait bag and approximately 3 kg of frozen Pacific hake (*Merluccius productus*) loose in the trap. The species of squid used was not determined but was of a grade that is consistent with the bait used in the commercial fishery. Type 1 traditional tagging sets consisted of strings of approximately 65 traps while the StRS design Type 3 tagging sets each fished 25 traps.

The start and end positions of each set were recorded from the vessel's global positioning system (GPS) when the first and last anchors were set over the stern. The start and end bottom depths were recorded from the vessel's depth sounder when the respective anchors were set. The mean bottom depth of the set was calculated as the average of depth recordings from the vessel's depth sounder at one-minute intervals between the first and last anchors being set. The duration, or soak time, of the set was calculated as the time elapsed between the first anchor being set over the stern and the first anchor hauled aboard. Figure C.1 shows an example of a completed bridge log data form. In addition to the bridge log, science staff also observed each set from the deck and completed a set log (Figure C.2). Figure D. 1 and Figure D. 2 are deck diagrams for the F/V Pacific Viking and F/V Viking Sunrise, respectively. The diagrams show a schematic of how the deck space was used for survey tasks.

2.5 ESCAPE RING EXPERIMENT DESIGN

An escape ring experiment was conducted during the Type 1 tagging sets. This study was intended to contrast catch rates and the size frequency of retained fish between traps fitted with four different escape ring treatments. The sizes of the escape rings are specified as the internal diameter in inches. The rings were manufactured according to imperial units (inches) so the metric measurements are approximations. The treatments were : (E1) escape rings laced shut; (E2) two "industry standard" $3\ ^{1}/_{2}$ inch (89mm) inside diameter stainless steel escape rings; (E3) two $3\ ^{1}/_{2}$ inch (89 mm) inside diameter plastic escape rings; (E4) two $3\ ^{7}/_{8}$ inch (98 mm) inside diameter stainless steel escape rings (Table 8). The initial experimental design called for the E4 treatment to use 4 inch (102 mm) inside diameter rings. However, the traps used for this

experiment were part of the charter vessels regular fishing gear and it was incorrectly reported that the traps were fitted with 4 inch rings when in fact the rings were $3\ ^{7}/_{8}$ inches. As this error was not discovered until mid-way through the survey, the $3\ ^{7}/_{8}$ inch rings were retained for the balance of the experimental sets. All of the stainless steel escape rings (treatments E1, E2, and E4) were constructed from a single piece of $^{3}/_{16}$ inch (4.8 mm) diameter stainless steel round bar bent into a circle with the ends welded together (Figure 8). The plastic escape rings (treatment E3) were milled from a $^{3}/_{4}$ inch (19 mm) thick solid sheet of nylon such that a cross section of the ring material was a constant $^{3}/_{4}$ inch. The stainless steel rings were secured to the trap mesh by knotting twine through the escape ring opening while the plastic rings were attached to the trap mesh using zap straps passed through holes drilled in the ring material (Figure 8). Table 8 details the differences between the escape ring treatments. Because the traps used for the escape ring treatments were part of the vessels regular fishing gear treatments E2 and E3 had an additional pair of $3\ ^{7}/_{8}$ inch stainless steel escape rings laced shut.

Table 9 shows the ideal arrangement of escape ring study traps on each Type 1 tagging set. The actual arrangement of treatment traps is shown in Appendix H. Experimental blocks were always at least 4 traps from the ends of the string to avoid any end effects. For example, the end traps of a string may move due to the effects of current or weather on the buoys and buoylines. Each set had three or four experimental blocks of treatment traps spaced along the string. An effort was made to place at least 8 traps between each experimental block but this was not always possible due to a limited number of traps. Each block consisted of four adjacent traps with one of each of the four treatments. This blocked design was intended to expose each treatment within a block to the same local concentrations of fish. An effort was made to maintain the order of the treatments within each block (i.e., E1 then E2 then E3 then E4) but this was not always possible. Treatment traps were marked with plastic cards zap-strapped to the top mesh of the trap to facilitate treatment identification during gear retrieval.

2.6 CATCH AND EFFORT DATA COLLECTION

The catch of all species in each trap was counted and weighed. All catch weights were taken using a Marel M1100 portable, motion-compensating electronic platform scale. Small catches of small fish and invertebrates weighing less than 1 kg were counted but not always weighed whereas large catches of such small animals were weighed but not always counted. Effort data was calculated by tallying each trap as it was hauled aboard and by recording the time elapsed between the deployment of the first anchor set and retrieval of the first anchor hauled. Typically, a string of traps was set from shallow to deep and hauled in reverse; hence the first trap deployed was the last trap retrieved. Any damage to a trap was noted and the necessary repairs were affected by the vessel crew before the trap was set again. Figure C.3 shows an example of a completed catch log form. Data recorded on the catch log forms were transcribed to data entry forms to allow easier entry into electronic format (Figure C.4).

2.7 CATCH PROCESSING

2.7.1 Biological Samples

Sablefish were sacrificed and sampled after each set was completely hauled aboard. The fish were measured for fork length (L) in millimetres (mm) and, if weather conditions permitted accurate measurements, the whole body weight (W) was recorded in grams (g) or kilograms (kg).

The abdominal cavities were opened and the gonads were examined to determine the fish sex (S) and to visually estimate the state of maturity (M, see Appendix E). Sagittal otoliths (O) were collected for subsequent age determination. The otoliths were excised from the fish, cleaned, and stored in 50% glycerine and 3% thymol solution in Tres Bien plastic trays. In addition to L, S, and M, sablefish from the escape ring experiment were measured for girth (G) in millimetres. Girth was defined as the circumference of the fish at the anterior insertion of the pectoral fins. Species other than sablefish were sampled for LS(W) during the 2005 standardized charter. Figure C.5 and Figure C.6 show examples of completed sablefish biological sampling forms while Figure C.7 shows an example of a completed biological sampling form for other species. A type of biological sample is characterized using the letter abbreviations of the variables, e.g., LWSMO indicates that length, weight, sex, maturity, and otoliths were collected for the sample. Sometimes fish weight cannot be reliably collected due to excessive vessel motion and direct effects of wind on the scale, so the notation L(W)SMO indicates that weights were attempted but may not be available for all samples. All legal-sized sablefish sacrificed for biological samples were dressed, frozen, and landed as commercial catch.

2.7.2 Recovered Tagged Sablefish

Previously tagged sablefish recovered during the 2005 survey were re-released. The old tag was removed and a new tag was applied number was recorded on deck and the fork length was measured in mm. A new tag was inserted so that the old tag could be retained to avoid errors in recording the tag number. However, if a previously tagged sablefish was in poor condition, it was sacrificed and sampled for LS(W)MO after each set was completely hauled aboard. Figure C.8 shows an example of a completed recovered sablefish sampling form.

2.7.3 Tagging Procedures

Fish to be tagged were transferred from the sorting area using plastic baskets to a 2,400 litre fibreglass holding tank secured to the vessel's deck. The tank received a continuous supply of fresh seawater drawn from the surface via the vessel's fire pump system. Fish were removed from the holding tank by hand or with a dip-net and then measured for fork length (mm) on a wooden measuring board. A tag was inserted on the left side of each fish at the base of the dorsal fin using a Mark II Long Tagging gun. The tag was injected approximately 1 cm below and 2-3 cm behind the anterior insertion of the first dorsal fin. The tag was angled into the fish so the tag could stream and the vertebral column and internal organs would not be damaged. Any significant injuries to the fish were recorded prior to the fish being released. Figure C.9 shows an example of a completed tagging form.

2.7.3.1 Tag Type

All sablefish were tagged using a Floy FD-94 T-bar anchor tag. The information printed on the tag appeared as:

CSA REWARD PACIFIC BIO. STATION
NANAIMO, B.C. CANADA *## ### ###

where "*" is a letter and "#" is any single integer from 0 to 9, e.g. A00 123 456.

2.7.4 Standardized Sets At Offshore Indexing Localities

The goal for standardized sets conducted at offshore indexing localities was to obtain a LS(W)MO sample of at least 50 sablefish per set and a LSM sample of 80 to 100 fish per set. For each set, traps were allocated to each biological sample with the objective of distributing the selected traps along the entire length of the string. The specific selection method depended on the sablefish catch rate and varied from every trap, to every second or third trap, to a selection of traps spaced throughout the string. Prior to hauling each set, the first trap assigned to each sample was determined using a random number table. All the sablefish from each selected trap were included in the same sample. Fish from traps that were not allocated to either the LS(W)MO or LSM biological sample were processed as commercial catch. Specifically, the unused fish were "discarded" by the science staff and then sorted by the vessel crew. Small fish were released alive while large fish were kept and dressed to be landed as commercial catch.

For example, suppose the average catch rate was 10 fish per trap and trap 3 was selected for the LS(W)MO sample and trap 2 was selected for the LSM sample. The catch of traps 3, 9, 12, 18, and 24 would be allocated to the LS(W)MO sample while the catch of traps 2, 5, 8, 11, 14, 17, 20, and 23 would be allocated to the LSM sample. The catch from the remaining traps would be processed as commercial catch. Appendix F lists how the sablefish catch from each trap was allocated for each set during the standardized charter.

2.7.5 Standardized Sets At Mainland Inlet Localities

The goal for standardized sets conducted at mainland inlet localities was to tag and release fish in proportion to the catch for each set. Sets were numbered sequentially and the sablefish catch from even-numbered traps fished on even-numbered sets was tagged. Conversely, the catch from odd-numbered traps fished on odd-numbered sets was tagged. All the sablefish from traps selected for tagging were tagged. The sablefish from the remaining traps (odd-numbered traps for even-numbered sets and even-numbered traps for odd-numbered sets) were used to obtain a LS(W)MO sample of at least 50 fish per set. Fish in excess of the biological sampling requirements were processed as commercial catch. An attempt was made to spread the traps selected for the biological sample along the entire length of the string. All the sablefish from each selected trap were included in the biological sample. Appendix F lists how the sablefish catch of each trap was allocated for each set during the standardized charter.

2.7.6 Type 1 Tagging Sets

The first goal of the Type 1 tagging sets was to tag and release a total of 1000 sablefish in each of the five offshore tagging localities and 300 fish in each of the nine offshore indexing localities. Once the goal had been achieved in a locality, tagging was discontinued and the remainder of the sablefish were processed as commercial catch. Occasionally, the catch rates were sufficiently high that the tagging operation could not keep up with the hauling. For these sets, hauling was either suspended or the catch of some traps was discarded until room became available in the tagging tank and fish could again be directed to the tagging operation.

The F/V Viking Sunrise rarely achieved the 1000 fish tagging goals at the traditional tagging localities. This was partly due to the addition of the escape ring experiment as the catch of up to 16 traps in each set was used for biological sampling instead of tagging. The 1000 fish goal could have been achieved by deploying an additional set in the area but two factors

combined to preclude this option. First, the survey frequently encountered severe weather conditions that prevented fishing operations and second, the vessel had limited gear so an additional set would most often have required an additional day in any given area. The combined effect of this would have been a significant increase in survey duration and costs.

2.7.7 Escape Ring Experiment

The second goal of the Type 1 tagging sets was to collect catch rate data and biological samples from sablefish in the escape ring treatment traps. Catch rates in units of numbers and weight of sablefish per trap were recorded for each escape-ring treatment trap. In addition, a sample of approximately 50 fish was collected from each of the four treatments for each set , i.e., approximately 200 fish in total over four samples per set. Sablefish from each treatment were combined across all experimental blocks within a set, i.e. the sablefish catch from traps with treatment E1 in block 1 was combined with the catches from traps with treatment E1 in blocks 2, 3, and 4 to form the E1 sample for the set. Traps were selected to be included in the biological samples by block to try to account for localized differences in fish size along the set. For example, if the first block of escape-ring traps was selected for the biological sample, then all sablefish from the E1 through E4 traps were included in the biological samples. Catch not used for biological samples was processed as commercial catch. Occasionally, the catch from E1 treatment traps in blocks that were being discarded was used for tagging.

Catch rate data from the escape ring experiment were analyzed using a mixed-effects linear model (Pinheiro and Bates 2000). The data were considered to be classified by two factors: a fixed treatment effect corresponding to the four escape ring configurations and a grouping factor corresponding to the different sets. The sets were modeled as random effects around a population mean. This model can be written as

$$(1) \qquad y_{ijk} = \beta_j + b_i + \varepsilon_{ijk} \quad ,$$

where y_{ijk} represents the observed catch rate for a trap corresponding to treatment $j = \mathrm{E1},\ldots,\mathrm{E4}$, fishing set $i = 1,\ldots,M$, and block $k = 1,\ldots n_i$. The β_j is the mean catch rate from the j-th treatment level, and b_i represent random deviations from the population mean catch rate due to sets. The random variable ε_{ijk} represents the deviation in catch rate for block k from the mean catch rate for treatment level j and set i. Two distributional assumptions are required, namely,

$$(2) \qquad b_i \sim N\left(0,\sigma_b^2\right) \text{ and } \varepsilon_{ijk} \sim N\left(0,\sigma^2\right) \quad .$$

The parameters to be estimated are $\left(\beta_j,\ \sigma_b^2,\ \sigma^2\right)$ regardless of the number of sets. Although the β_j have simple interpretations under model equation (1), this parameterization is not useful for comparing differences among treatment levels. The model can be re-written as

$$(3) \qquad y_{ijk} = \mu + \tau_j + b_i + \varepsilon_{ijk} \quad ,$$

where μ represents the overall mean catch rate and the τ_j represent changes, or contrasts, between treatments. The model is over-parameterized and a constraint must be applied to estimate the treatment effects. Polynomial contrasts were used that specify each of the escape ring configurations E2, E3, and E4 as deviations from the reference level E1. An analysis of variance table for the treatment effects represents a test of the hypothesis that

$H_0 : \tau_2 = \tau_3 = \tau_4 = 0$.

The *lme* function in the R statistical language (http://www.r-project.org/) was used to obtain Restricted Maximum Likelihood (REML) estimates $\left(\widehat{\tau_j}, \widehat{\sigma_b^2}, \widehat{\sigma^2}\right)$ of model parameters (Pinheiro and Bates 2000).

Biological data derived from the escape ring experiment was similarly modelled. However, because the individual fish could not be attributed to a specific trap, the size measurement from each fish rather than a trap was considered to be a replicate.

2.7.8 Type 3 Tagging Sets

For Type 3 sets, the catch from approximately $^1/_3$ of the traps was used for tagging, $^1/_3$ for biological samples and $^1/_3$ processed as commercial catch. Prior to hauling, the first trap of each set was randomly assigned to either commercial catch (D), biological samples (A), or tagging (T). Subsequent traps were assigned the next sequential category following the order commercial, biosample, tagging (DAT). For example, if trap 1 was assigned to be tagged (T), trap 2 was processed as commercial catch (D), trap 3 was used for the biological sample (A), trap 4 was tagged (T), etc. The sampling goal of the Type 3 tagging sets was to obtain a 50 piece LS(W)MO biological sample with the objective of distributing the traps selected for the sample along the entire length of the string. For sets with low catch rates, traps assigned to be processed as commercial catch were allocated to the biological sample to achieve the required minimum sample size. For sets with high catch rates, some traps assigned to the biological sample were processed as commercial catch if it was clear that the sample size goal would be exceeded. In every case all the sablefish in each trap were utilized for the assigned purpose, i.e., biological sample or tagging. Appendix G lists how the sablefish catch of each trap was used within each set of the StRS design.

2.8 OCEANOGRAPHIC SAMPLING

A Seabird SBE 39 temperature and depth logger was attached inside a trap on selected sets for each charter. These data will be summarised elsewhere.

3.0 RESULTS AND DISCUSSION

3.1 CATCH RATES

The annual distributions of catch rates (number of sablefish/number of traps) by set are summarised by boxplots in Figure 9 for (1) standardized sets conducted at offshore indexing

localities, (2) standardized sets conducted at mainland inlet localities, and (3) Type 1 tagging sets conducted at both offshore tagging localities and offshore indexing localities. The lower bound of the box indicates the first quartile (25th percentile) of the data and the upper bound of the box indicates the third quartile (75th percentile). The horizontal line that divides the box is the median (50th percentile). The upper and lower whiskers are positioned at 1.5 times the inter-quartile range. Open circles indicate data values that fall outside the whiskers, or outliers. The lightly shaded rectangle positioned in each box represents an approximate 95 percent confidence interval for the sample median. Solid circles indicate the mean catch rate for each year. The nominal data are presented here with no attempt to filter data or standardize for any factors. All traps that could have captured fish were included in the calculation of catch rates. For example, holed or fouled traps were included while open traps were excluded. In some cases complete sets from previous surveys were excluded. For example, set types other than standardized and tagging sets, or sets where the total catch was not recorded are not represented in the time-series plotted in Figure 9. The fishing protocol has varied over the time period shown (Wyeth and Kronlund 2003, Wyeth et al. 2004b). Specifically, the more recent surveys have spanned a greater depth range than the early surveys. The 1988 and 1989 catch rates are not shown as the fishing protocols were significantly different than subsequent surveys, with much longer strings and different baiting practices (Wyeth and Kronlund 2003).

High catch rates were achieved during standardized sets at offshore indexing localities until 1993, but from 1994 to 2000, consistently low catch rates were observed (Figure 9, top panel). The 2001 survey yielded the lowest mean standardized catch rate and also exhibited significantly reduced variability among sets. In 2002, catch rates were at levels similar to those achieved in the late 1990s and in 2003 the mean catch rate was near highs observed in the early 1990s. The highest individual set catch rates of the time series were observed in 2003. Annual catch rates have declined each year since 2003 and are now at a level similar to the early 1990s.

In years when both standardized sets and Type 1 tagging sets were conducted at offshore localities, the catch rates for tagging sets were greater (Figure 9). This may be due to the target depths and locations of the traditional tagging sets but it may also be due to the addition of Pacific hake to the bait load which is reported by commercial fishers to increase trap efficiency. Catch rates from the 2005 Type 1 tagging sets appear to differ little from 2004.

Catch rates of standardized sets conducted at mainland inlet localities have remained relatively consistent among years with the highest catch rates observed in 1998, 1999, 2003 and 2004 (Figure 9). Catch rates for inlet sets were slightly lower in 2005 than in 2004 but remain at a high level relative to the historical time series.

The range of catch rates for the stratified random design survey has been similar to the range of catch rates for the traditional survey for the years where both surveys were conducted (Figure 9 and Figure 10). Within the random design survey, the pattern of catch rates among the depth strata has also been the same each year. In particular the following observations can be made by inspection of the figures:

- the highest variability was exhibited in the shallow stratum;
- the highest catch rates were achieved in the middle stratum;

- the lowest catch rates and associated variability were obtained in the deep stratum;
- mean catch rates from the shallow and middle depth strata were lower in 2004 and 2005 than in 2003;
- sets in the deep stratum show higher catch rates in 2004 and 2005 relative to those achieved in 2003;
- catch rates from all three depth strata appear less variable in 2004 and 2005 than in 2003; and
- catch rates were lower and less variable in 2004 and 2005 than in 2003 for all spatial strata except southern Vancouver Island (S_1 in Figure 9).

3.2 CATCH COMPOSITION

Forty-seven species or taxonomic groups were represented in the catches from standardized sets conducted at offshore indexing localities (Table 10). Other than sablefish, the most common species in order of total weight captured were arrowtooth flounder (*Atheresthes stomias*), lingcod (*Ophiodon elongatus*), rougheye rockfish (*Sebastes aleutianus*), giant grenadiers (*Albatrossia pectoralis*), Pacific halibut (*Hippoglossus stenolepis*), and Pacific grenadiers (*Coryphaenoides acrolepis*). Other species accounted for minor fractions of the total catch.

Twelve species or taxonomic groups were represented in the catches from standardized sets conducted at mainland inlet localities (Table 11). Other than sablefish, the most common species in order of total weight captured were Pacific halibut (*Hippoglossus stenolepis*) and Pacific sleeper shark (*Somniosus pacificus*). Both Pacific halibut and Pacific sleeper sharks captured in trap gear were generally large fish, so that the total number of individuals captured in the inlets was relatively minor at 23 specimens and 1 specimen, respectively. Other species accounted for minor fractions of the total catch.

Seventeen species or taxonomic groups were represented in the catch from Type 1 tagging sets (Table 12). Other than sablefish, the most common species in order of total weight were arrowtooth flounder (*Atheresthes stomias*) and rougheye rockfish (*Sebastes aleutianus*). Other species accounted for minor fractions of the total catch.

Forty-eight species or taxonomic groups were captured during the StRS design (Type 3 tagging sets, Table 13). Other than sablefish, the most common species in order of total weight were arrowtooth flounder (*Atheresthes stomias*), lingcod (*Ophiodon elongatus*), dogfish (*Squalus acanthias*), Pacific halibut (*Hippoglossus stenolepis*), giant grenadiers (*Albatrossia pectoralis*), grooved tanner crab (*Chionoecetes tanneri*), Pacific grenadiers (*Coryphaenoides acrolepis*), rougheye rockfish (*Sebastes aleutianus*), and redbanded rockfish (*Sebastes babcocki*). Other species accounted for minor fractions of the total catch.

Although sablefish do not always dominate the catch for the shallowest and deepest depths fished, the overall catch of other species in both number and weight is minor relative to sablefish for all set types in all areas. This may be due to the selectivity characteristics of trap gear and/or to the depths fished during the survey. The differences in species composition among the set types conducted in 2005 may be explained in part by the range of depths fished. For example, the standardized sets in offshore localities and the StRS design sets captured relatively

more grenadiers and lingcod than the offshore Type 1 tagging sets. These two species typically occur respectively at the deeper and shallower ends of the depth distribution of sablefish. The difference in species composition between the set types may be because the standardized and StRS design sets were fished over a broader depth range and at a relatively deeper mean depth than the Type 1 tagging sets. Differences in catch composition could also be attributed to bait. For example, the StRS design sets captured significantly more dogfish than the standardized sets while both sets are fished over similar depth ranges. However, the StRS design sets are baited with both squid and hake while the standardized sets are baited with squid only.

3.3 SABLEFISH SAMPLING AND TAGGING

Of the 28,366 sablefish captured during the 2005 traditional survey (includes all offshore and inlet standardized sets as well as Type 1 tagging sets), 18,849 were either tagged or used for biological sampling (Table 14). A total of 10,728 sablefish were tagged and released with 3,127 of the total releases from offshore indexing localities, 4,138 from offshore tagging localities, and 3,463 from the inlet localities. In addition, 7,937 sablefish were sampled for length, sex, and maturity state and 1,883 of these fish were also measured for girth as part of the escape ring study. Otoliths and individual fish weights were collected from an additional 3,362 sablefish. A total of 184 previously tagged sablefish were recovered during the 2005 traditional survey.

Of the 17,730 sablefish captured during the 2005 random design survey, 9,066 were either tagged or used for biological sampling (Table 15). A total of 5,752 sablefish were tagged and released and 62 previously tagged sablefish were recovered. In addition, 3,252 sablefish were sampled for length, sex, maturity state, and otoliths and 2,095 of these fish were individually weighed

Overall, both the traditional (Table 16) and StRS design (Table 17) sets had proportionately more males than females but the sex ratio varied by both area and depth. More females than males were seen at all traditional offshore indexing localities. Fewer females than males were seen in some of the traditional offshore tagging localities but biological samples in these localities were only collected as part of the escape ring experiment and may not be representative of the overall catch. The highest proportions of females were seen in the mainland inlet sets with sex ratios ranging from 60 to 73 percent female. More females than males were also seen in the shallow depth stratum of each spatial stratum of the StRS design. In contrast, there were fewer females than males in the mid depth strata in each spatial strata. The sex ratio in the StRS design deepest depth stratum varied between spatial strata but when grouped over all spatial strata, there were proportionately more females than males. The differences between the StRS design and the traditional survey may be explained by the broader range of depths fished during the standardized component of the traditional survey. The mean fork length of females was greater than that of males at all the traditional survey localities (Table 16) and within all the StRS design strata (Table 17).

Details on the number of sablefish captured, sampled, and tagged for each set are shown in Appendix I for the standardized survey charter and in Appendix J for the tagging charter.

3.4 ESCAPE RING EXPERIMENT RESULTS

The survey vessel F/V Viking Sunrise completed a single Type 1 tagging set in each of the five tagging localities and nine indexing localities. This resulted in a total of 14 sets that included traps configured for the escape ring experiment. Traps deployed for the experiment were excluded from the analyses if they were determined to be fishing incorrectly. Reasons for excluding a trap included snarls, holes in the mesh, incorrect baiting, or if a fish was stuck in the escape ring opening or in the trap mesh. In addition, during the deployment of set 30, one of the E2 treatment traps was discovered to have an additional open escape ring. This trap could have been any one of the E2 traps used prior to set 30 because traps were not individually identified. Thus, all E2 traps prior to set 30 were excluded from the analyses. Details on the number of traps deployed, the number of traps selected for analyses, as well as catch data are shown by treatment and set in Table K.1.

The catch rate distributions by treatment are summarised using boxplots for all traps and for selected traps in Figure 11. Figure panels show catch rates both in units of numbers and weight (kg) of sablefish per trap. The numbers of observations are shown for each treatment and solid circles indicate the mean catch rate for each treatment. The number and weight of sablefish per trap is shown for each set and treatment in Table 18 and Figure 12. Although catch rates from treatment traps were highly variable among and within sets, the overall mean catch rate of treatment traps (E2, E3, and E4) was lower than the control (E1) in both numbers and total weight. Furthermore, the treatment with the largest escape ring openings (E4) exhibited the lowest catch rates. The exclusion of traps that were not fishing correctly did not appear to have a major impact on the overall distribution of catch rates (Figure 11).

Catch rate data (numbers per trap, kg per trap) were analyzed using the linear mixed effects model specified in equation (2). Examination of the residuals from an initial fit to catch rates (numbers per trap) suggested a square root transformation of the response variable would help meet distributional assumptions. Results of model fitting are summarized in Table 19. For example, the overall effect of escape ring treatments where the response was numbers of fish per trap was significant ($F_{3,162} = 8.75$, $p<0.0001$). The estimated random effects (among sets) variance was $\widehat{\sigma_b^2} = 0.1266$, while the estimated residual error (among traps within set) was $\widehat{\sigma^2} = 1.020$. Thus, the variance in catch rates within a set was about 8.5 times the variance among sets on a square root transformed scale and 65 times greater on the numbers per trap scale.

Approximate 95 percent confidence intervals for the fixed effects are listed in Table 19. These intervals represent contrasts between treatment level E1 (closed escape rings) and the indicated treatment level. Confidence intervals that include 0 indicate that catch rates for the treatment level are not significantly different from those achieved with closed rings. Thus, when catch rate is expressed in terms of numbers per trap, treatment E2 (steel 3 $^1/_2$ inch rings) and treatment E4 (steel 3 $^7/_8$ inch rings) showed significantly lower catch rates than traps with closed rings. There was no difference between catch rates for traps with rings closed and traps equipped with plastic 3 $^1/_2$ inch rings (E3). In contrast, when catch rates are measured as kg per trap only treatment E4 (steel 3 $^7/_8$ inch rings) showed a significantly lower catch rate than traps with closed rings.

Escape ring treatment traps were selected for biological samples by treatment block in an attempt to mitigate confounding effects introduced by trap position along the groundline. In other words, fish might differ in biological characteristics along the length of the set. Unfortunately, limited man-power and deck space meant that sablefish selected for sampling from each treatment had to be combined across blocks. The result of these logistical constraints was that sablefish from traps that were excluded from the catch rate analyses were actually included in the analyses of fish size. In addition, treatment E1 typically had significantly more fish to sample than treatment E4. Details on the number of fish sampled as part of the escape ring study are shown in Table K 2.

A total of 1,888 sablefish were sampled over the 14 escape ring sets (Table 20). Sablefish fork length and girth are highly correlated and the relationship does not appear to differ between treatments or sexes (Figure 13). Although sablefish size was highly variable among sets and within treatments (Figure 14) there was a tendency within each set for average fish size to increase with increasing escape ring size (Figure 15 and Figure 16). The average size of fish in the escape ring treatment traps (E2, E3, and E4) was larger than fish captured by the control (E1) traps. The treatment with the largest escape ring (E4) retained fish with the largest average size (Table 21). Inspection of Table 20 indicates that the escape ring treatments E2 through E4 retained a lower proportion of male sablefish than traps with rings closed, and the largest escape ring (E4) generally retained the lowest proportion of males. A detailed summary of the biological data collected from sablefish sampled as part of the escape ring study is shown in Table K 3.

Results of fitting the mixed-effects model in equation (2) to fork length and girth data are shown in Table 19. Significant differences in fish size were found for both variables. All traps equipped with open escape rings retained larger fish on average than the traps equipped with closed rings. The mean size of fish retained in treatment E4 traps was considerably larger than those retained by treatments E2 and E3 for both fork length and girth variables (Table 19).

Table 22 shows the number of escape ring study traps that were hauled aboard with sablefish stuck in the escape ring openings by treatment level and set. In 14 sets, 162 traps were deployed with open escape rings and hence that could have fish stuck in the rings. Thirteen of the traps had sablefish stuck in the escape rings and these traps occurred on seven of the sets. Treatment E1 (closed rings) had no fish stuck in the escape rings. Fish were observed stuck in the escape rings for both treatments E2 and E4 but not for treatment E3. Treatment E2 and E3 had the same internal opening of $3\ ^{1}/_{2}$ inch but the E3 rings were made of $^{3}/_{4}$ inch plastic while the E2 rings were made of ¼ inch stainless steel. The E4 treatment consisted of escape rings with $3\ ^{7}/_{8}$ inch internal diameters made of ¼ inch stainless steel. These data suggest that the plastic rings with larger diameter material may be more effective in preventing fish from becoming stuck in the escape ring opening. One possible mechanism for these results may be related to the method used to attach the rings to the trap web. Figure 8 shows photographs of each of the escape ring treatment rings in the traps. The stainless steel escape rings were attached to the trap mesh by repeatedly tying twine over the escape ring material and the trap web. This not only effectively reduces the internal diameter of the escape ring but also results in a rough, irregularly shaped opening. In fact, the stainless steel rings are not perfectly round by virtue of their construction and may be slightly ovoid when new or after some use. In contrast, the plastic E3

escape rings were attached to the trap web by zap straps inserted through holes in the escape ring material leaving a round and smooth opening that would offer less resistance to fish trying to escape the trap. Given this difference, it might be expected that the E3 rings would have been more efficient than the E2 rings in reducing the number of small fish that were retained but this was not found to be the case in this study.

In summary, high variability and a relatively small sample size (14 sets) may have reduced the power of statistical tests to detect differences in trap performance due to escape ring configurations. Overall, traps with larger escape rings had fewer and larger sablefish and the retained fish were predominantly females. Note that the experiment allowed inference on the catch rates and biological properties of *retained* sablefish, and did not necessarily reveal a complete picture of trap performance since the number and sizes of sablefish leaving the traps was not observed. Another factor potentially affecting escape ring performance is soak time. Sablefish may not try to leave a trap until all the bait is consumed or the efficacy the bait is reduced by washing in the prevailing currents. Both Pacific hake and squid bait were often present in the trap upon hauling after a 24 hour soak. This factor could not be evaluated since all soaks were as close to 24 hours as possible. It is not know whether high densities of sablefish in a trap serve to repel or attract other fish. It is recommended that future studies of trap performance be completed as a dedicated project rather than as an add-on to the tagging and stock indexing surveys. This would allow, more detailed sampling protocols, greater replication of experimental factors, and would also simplify the conduct of the survey sets.

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Table 1. Summary of sets conducted during the 2005 sablefish research and assessment survey. Biosampling codes correspond to length (L), sex (S), weight (W), maturity (M), and excision of otoliths (O) for ageing.

Survey component	Charter	Set type	Location	Depth	Traps/ Set	Bait	Sablefish catch processing
Traditional	Standardized (**Pacific Viking**)	Standardized	nine offshore indexing localities	7 depth intervals	25	1 kg squid	50 piece LS(W)MO biosample, 80-100 piece LSM biosample
	Standardized (**Pacific Viking**)	Standardized	five mainland inlet localities	prevailing depth	25	1 kg squid	½ of traps used for tagging, ½ of traps used for biosample (50 piece LS(W)MO)
	Tagging (**Viking Sunrise**)	Type 1 (traditional) tagging	five offshore tagging localities	250-450 fm	~65	1 kg squid plus 4.5 kg hake	all tagged until 1000 fish released in each locality
	Tagging (**Viking Sunrise**)	Type 1 (traditional) tagging	nine offshore indexing localities	250-450 fm	~65	1 kg squid plus 4.5 kg hake	all tagged until 300 fish released in each locality
Stratified random sampling (StRS)	Tagging (**Viking Sunrise**)	Type 3 (random) tagging	five spatial strata	3 depth strata	25	1 kg squid plus 4.5 kg hake	1/3 of traps used for tagging, 1/3 of traps used for biosample (50 piece LS(W)MO), 1/3 of traps discarded

Table 2. British Columbia sablefish research and assessment surveys, 1988 to 2005.

Year	Vessel	Skipper	Dates	Sets	GFBio Trip ID
1988	Vicious Fisher	Vance Fletcher	28 Oct - 24 Nov	16	43990
1989	La Porsche	Sigurd Brynjolfson	19 Oct - 18 Nov	29	43910
1990	Viking Star	Doug Farrington	08 Nov - 18 Nov	24	43750
1991	W. E. Ricker	Alan Farrington	09 Oct - 29 Oct	32	43673
1992	W. E. Ricker	Ron Roberts	13 Oct - 04 Nov	38	43670
1993	W. E. Ricker	Alan Farrington	19 Oct - 11 Nov	42	43650
1994	La Porsche	Richard Beauvais	13 Oct - 31 Oct	39	43630
	Western Viking	Rick Jones	18 Oct - 13 Nov	27	43390
1995	Viking Sunrise	Jason Olsen	01 Oct - 31 Oct	40	43350
	Ocean Pearl	Robert Fraumeni	08 Oct - 20 Oct	29	43270
	Victor F	Michael Derry	11 Oct - 28 Oct	34	43330
1996	Viking Sunrise	Albert Melnychuk	10 May - 30 May	42	43024
	Ocean Pearl	Michael Derry	26 Sep - 10 Oct	32	43039
	Viking Star	Otto Elvan	30 Sep - 22 Oct	49	43210
1997	Viking Sunrise	Albert Melnychuk	20 May - 10 Jun	42	42760
	Ocean Pearl	Michael Derry	26 Sep - 21 Oct	74	42699
1998	Ocean Pearl	Michael Derry	22 Sep - 17 Oct	89	41122
1999	Ocean Pearl	Michael Derry	29 Sep - 30 Oct	109	40589
2000	Pacific Viking	Albert Melnychuk	08 Oct - 14 Nov	131	40517
2001	Ocean Pearl	Michael Derry	06 Oct - 06 Nov	134	43233
2002	Pacific Viking	Albert Melnychuk	04 Oct - 07 Nov	125	48120
	Viking Sunrise	Jason Olsen	05 Oct - 13 Nov	90	48110
2003	Viking Star	Jim Farrington	07 Oct - 10 Nov	84	52120
	Ocean Pearl	Michael Derry	15 Oct - 13 Nov	94	52100
2004	Ocean Marauder	Albert Melnychuk	05 Oct - 03 Nov	84	57360
	Milbanke Sound	Don Quast	05 Oct - 15 Nov	95	58145
2005	Pacific Viking	Albert Melnychuk	04 Oct - 02 Nov	84	60529
	Viking Sunrise	Rory Johnson	07 Oct - 17 Nov	88	60503

Table 3. Geographic boundaries of the traditional sablefish survey offshore localities.

Locality	Latitude north		Longitude west	
	Maximum	Minimum	Maximum	Minimum
Offshore indexing				
Langara Island-North Frederick	54°09′	53°59′	134°2′	133°32′
Hippa Island	53°32′	53°20′	133°24′	132°55′
Buck Point	53°14′	53°01′	133°10′	132°35′
Gowgaia Bay	52°27′	52°17′	131°51′	131°33′
Cape St. James [1]	51°50′	51°37′	130°59′	130°19′
Triangle Island	51°08′	50°58′	129°55′	129°31′
Quatsino Sound	50°25′	50°12′	128°38′	128°08′
Esperanza Inlet	49°47′	49°24′	127°39′	127°13′
Barkley Canyon	48°24′	48°10′	126°12′	125°53′
Offshore tagging				
Rennell Sound	53°33′	53°14′	133°17′	132°55′
Tasu Sound	52°49′	52°34′	132°16′	131°58′
Middle Ground	51°20′	51°09′	130°9′	129°57′
Pisces Canyon	50°37′	50°29′	128°47′	128°34′
Estevan Point	49°16′	48°59′	127°10′	126°53′
Father Charles Canyon	48°29′	48°46′	126°35′	126°09′

[1] The South Moresby Rockfish Protected Area (RPA) overlaps slightly with the Cape St. James survey locality so sets were not made in the Northwest corner of the locality. The South Moresby RPA is described as: McLean-Fraser Point to Grey Rock: Sub-areas 2-31 to 2-37 and those portions of Sub-areas 102-3, 130-3 and 142-1 that are inside of a line that begins at 52 deg 12 min north and 131 deg 25 min west, then south-westerly to 52 deg 11 min north and 131 deg 30 min west, then south-easterly to 51 deg 49 min north and 130 deg 57 min west, then northerly to 51 deg 54 min north and 130 deg 54 min west, then north-easterly to 51 deg 59 min north and 131 deg west.

Table 4. Geographic boundaries of the set locations within each mainland inlet locality. Each set location was defined as the area enclosed by the polygon with vertices at each of the four or five indicated points.

		Point 1		Point 2		Point 3		Point 4		Point 5	
		Latitude	Longitude	Latitude	Longitude	Latitude	Longitude	Latitude	Longitude	Latitude	Longitude
Locality	Location	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′
Portland	1	54 51.90	130 14.70	54 54.75	130 11.43	54 53.53	130 07.50	54 50.51	130 10.45		
Inlet	2	54 46.57	130 15.18	54 48.70	130 19.46	54 49.97	130 16.82	54 48.14	130 12.85		
	3	54 44.25	130 21.31	54 46.29	130 24.31	54 47.83	130 21.43	54 45.24	130 17.90		
	4	54 43.52	130 22.73	54 40.21	130 23.55	54 42.28	130 28.61	54 45.42	130 26.19		
	5	54 39.31	130 26.42	54 37.27	130 30.74	54 39.29	130 35.00	54 41.80	130 30.17		
Gil Island	1	53 18.05	129 16.39	53 18.44	129 19.88	53 21.43	129 19.95	53 19.66	129 16.42		
	2	53 09.54	129 20.71	53 09.91	129 25.97	53 12.99	129 24.20	53 12.98	129 19.84		
	3	53 06.18	129 18.06	53 04.06	129 21.26	53 07.44	129 24.93	53 08.68	129 20.47		
	4	53 07.25	129 05.11	53 05.89	129 05.03	53 05.84	129 09.03	53 07.42	129 08.51		
	5	53 11.48	129 05.23	53 09.64	129 05.11	53 09.87	129 09.73	53 12.37	129 08.86		
Finlayson	1	52 45.95	128 26.18	52 46.80	128 27.62	52 48.50	128 27.06	52 47.76	128 24.27		
Channel	2	52 44.04	128 26.51	52 41.68	128 25.75	52 42.06	128 28.50	52 44.40	128 28.94		
	3	52 40.09	128 26.28	52 38.70	128 26.49	52 38.58	128 30.19	52 40.92	128 29.26		
	4	52 34.94	128 26.40	52 33.73	128 25.99	52 33.77	128 29.28	52 35.14	128 29.82		
	5	52 30.05	128 25.23	52 29.61	128 28.35	52 31.58	128 29.35	52 31.45	128 26.22		
Dean/ Burke	1	52 21.75	127 26.49	52 19.95	127 27.44	52 20.03	127 30.27	52 21.89	127 28.77		
Channel	2	52 27.03	127 14.35	52 25.39	127 14.18	52 26.38	127 16.35	52 27.22	127 17.64	52 27.83	127 16.18
	3	52 16.38	127 13.24	52 15.01	127 16.01	52 16.27	127 17.70	52 17.50	127 15.34		
	4	52 13.00	127 27.24	52 14.71	127 24.89	52 13.36	127 22.83	52 11.53	127 25.11		
	5	52 07.46	127 34.67	52 06.33	127 36.72	52 07.44	127 38.90	52 08.74	127 35.60		

Table 5. Localities visited during sablefish research and assessment surveys from 1994 through 2005 showing the number of standardized (S) and tagging (T) sets completed at each locality. For simplicity, surveys conducted prior to 1994 and the spring tagging surveys conducted in 1996 and 1997 are not shown (for details on these surveys, see Wyeth and Kronlund 2003). Localities that are no longer visited are shown in *italics*.

	Year	1994		1995		1996		1997		1998		1999		2000		2001		2002		2003		2004		2005	
	Set Type	**S**	**T**	**S**	**T**	**S**	**T**	**S**	**T**	**S**	**T**	**S**	**T**	**S**	**T**	**S**	**T**	**S**	**T**	**S**	**T**	**S**	**T**	**S**	**T**
	Locality																								
Offshore Indexing	Langara Island-North Frederick	5	-	5	-	5	-	5	-	5	-	6	1	8	1	5	1	7	7	7	1	7	1	7	1
	Louis Point-Frederick Island	-	-	-	-	-	-	-	-	-	-	-	-	-	-	*3*	-	-	-	-	-	-	-	-	-
	Kunakun Point	-	-	-	-	-	-	-	-	-	-	-	-	-	-	*3*	-	-	-	-	-	-	-	-	-
	Hippa Island	5	-	5	-	5	-	-	-	5	-	6	1	8	1	5	1	21	12	7	1	7	1	7	1
	Buck Point	5	-	5	-	5	-	5	-	5	-	6	1	5	1	5	1	7	7	7	1	7	1	7	1
	Tasu Sound-Marble Island	-	-	-	-	-	-	-	-	-	-	-	-	*6*	-	*6*	-	-	-	-	-	-	-	-	-
	Gowgaia Bay	5	-	5	5	5	-	5	-	5	-	6	1	8	1	8	1	21	7	7	1	7	1	7	1
	Flamingo Inlet	-	-	-	-	-	-	-	-	-	-	-	-	*3*	-	*3*	-	-	-	-	-	-	-	-	-
	Cape St. James	5	-	5	-	5	-	5	-	5	-	5	1	5	1	5	1	7	7	7	1	7	1	7	1
	Triangle Island	5	-	5	-	5	-	5	-	5	-	5	1	5	1	5	1	7	7	7	2	7	1	7	1
	Quatsino Sound	5	-	5	-	5	-	5	-	5	-	5	1	8	1	8	1	7	7	7	1	7	1	7	1
	Solander Island	*5*	-	*5*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Esperanza Inlet	5	-	5	-	5	-	5	-	5	-	5	1	8	1	8	1	21	7	7	1	7	1	7	1
	Barkley Canyon	5	-	5	-	5	-	5	-	5	-	5	1	8	1	8	1	7	12	8	1	8	1	8	1
	Total	**50**	**-**	**50**	**5**	**45**	**-**	**40**	**-**	**45**	**-**	**49**	**9**	**72**	**9**	**72**	**9**	**105**	**73**	**64**	**10**	**64**	**9**	**64**	**9**
Mainland Inlet	Portland Inlet	5	-	5	-	5	-	5	-	5	-	5	-	5	-	5	-	5	-	5	-	5	-	5	-
	Gil Island	5	-	5	-	5	-	5	-	5	-	5	-	5	-	5	-	5	-	5	-	5	-	5	-
	Finlayson Channel	-	1	3	-	4	-	5	-	5	-	5	-	5	-	5	-	5	-	5	-	5	-	5	-
	Mathieson Channel	-	*1*	-	-	*1*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Dean/Burke Channel	-	-	5	-	5	-	5	-	5	-	5	-	5	-	5	-	5	-	5	-	5	-	5	-
	Total	**10**	**2**	**18**	**-**	**20**	**-**	**20**	**-**	**20**	**-**	**20**	**-**	**20**	**-**	**20**	**-**	**20**	**-**	**20**	**-**	**20**	**-**	**20**	**-**

Year		1994		1995		1996		1997		1998		1999		2000		2001		2002		2003		2004		2005	
Set Type		**S**	**T**	**S**	**T**	**S**	**T**	**S**	**T**	**S**	**T**	**S**	**T**	**S**	**T**	**S**	**T**	**S**	**T**	**S**	**T**	**S**	**T**	**S**	**T**
Locality																									
Offshore Tagging	*Frederick Island*	-	-	-	*10*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Hogback	-	-	-	-	-	-	-	*2*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Rennell Sound	-	-	-	-	-	2	-	2	-	-	-	8	-	5	-	4	-	2	-	2	-	1	-	-
	Chads Point	-	-	-	*5*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Tasu Sound	-	-	-	-	-	2	-	2	-	5	-	5	-	3	-	4	-	3	-	1	-	2	-	1
	Anthony Island	-	-	-	*3*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Mitchell's Gully/Middle Ground	-	-	-	3	-	3	-	2	-	4	-	3	-	4	-	4	-	3	-	1	-	2	-	1
	Pisces Canyon	-	-	-	2	-	3	-	2	-	4	-	6	-	4	-	4	-	3	-	2	-	2	-	1
	Kyuquot Sound-Ouokinish Inlet	-	-	-	-	-	-	-	-	-	*4*	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Estevan Point	-	-	-	2	-	3	-	2	-	4	-	4	-	4	-	4	-	3	-	1	-	2	-	1
	Father Charles Canyon	-	-	-	2	-	3	-	2	-	3	-	4	-	4	-	4	-	3	-	2	-	2	-	1
	Total	**-**	**-**	**-**	**27**	**-**	**16**	**-**	**14**	**-**	**24**	**-**	**30**	**-**	**24**	**-**	**24**	**-**	**17**	**-**	**9**	**-**	**11**	**-**	**5**
Grand Total		**60**	**2**	**68**	**22**	**65**	**16**	**60**	**14**	**65**	**24**	**69**	**37**	**92**	**33**	**92**	**33**	**125**	**90**	**84**	**19**	**84**	**20**	**84**	**14**

Table 6. Sablefish research and assessment survey depth intervals.

Depth interval	Minimum depth m (fm)	Maximum depth m (fm)
Offshore standardized		
D0	91 (50)	274 (149)
D1	274 (150)	457 (249)
D2	457 (250)	641 (349)
D3	641 (350)	824 (449)
D4	824 (450)	1006 (549)
D5	1006 (550)	1189 (649)
D6	1189 (650)	1372 (749)
D7	1372 (750)	1827 (999)
Type 1 tagging		
	457 (250)	824 (450)
Type 3 tagging		
RD_1	183 (100)	457 (250)
RD_2	457 (250)	824 (450)
RD_3	824 (450)	1372 (750)
Mainland inlet standardized		
	prevailing depth at set locations	

Table 7. Summary of the stratified random sampling survey strata. The area (km^2) of each spatial (S_i) and depth (RD_j) stratum combination is indicated, with the number of possible 2 km by 2 km sampling units per stratum in parentheses ().

Stratum	RD_1 183-457 m (100-250 fm)	RD_2 457-824 m (250-450 fm)	RD_3 824-1372 m (450-750 fm)	All depths
S_1	1,088 (272)	1,236 (309)	2,024 (506)	**4,348 (1,087)**
S_2	976 (244)	1,252 (313)	2,236 (559)	**4,464 (1,116)**
S_3	3,628 (907)	1,240 (310)	1,372 (343)	**6,240 (1,560)**
S_4	456 (114)	496 (124)	1,384 (346)	**2,336 (584)**
S_5	1,508 (377)	1,020 (255)	1,672 (418)	**4,200 (1,050)**
All areas	**7,656 (1,914)**	**5,244 (1,311)**	**8,688 (2,172)**	**21,588 (5,397)**

Table 8. Summary of escape ring study treatment levels.

	Escape Ring				
Treatment	**Number per trap**	**Material**	**Attachment method**	**Internal diameter**	**Escape ring opening status**
E1	2	3/16 (4.8 mm) stainless steel round bar	twine knotted through opening	3 7/8 inch (98 mm)	laced shut with orange twine
E2	2	3/16 (4.8 mm) stainless steel round bar	twine knotted through opening	3 1/2 inch (89 mm)	open
E3	2	3/4 inch (19 mm) round plastic	zap straps through holes	3 1/2 inch (89 mm)	open
E4	2	3/16 (4.8 mm) stainless steel round bar	twine knotted through opening	3 7/8 inch (98 mm)	open

Table 9. Utilization of sablefish caught on escape ring study sets.

Treatment block	Trap number	Escape ring treatment	Sablefish status
	1-10	***Closed***	***Tagged***
1	11	E1 – rings sewn shut	Biological sample E1
1	12	E2 – 2 x 3 $^{1}/_{2}$ inch steel rings $^{3}/_{16}$ stock	Biological sample E2
1	13	E3 – 2 x 3 $^{1}/_{2}$ inch plastic rings $^{3}/_{4}$ stock	Biological sample E3
1	14	E4 – 2 x 3 $^{7}/_{8}$ inch steel rings $^{3}/_{16}$ stock	Biological sample E4
	15-25	***Closed***	***Tagged***
2	26	E1 – rings sewn shut	Biological sample E1
2	27	E2 – 2 x 3 $^{1}/_{2}$ inch steel rings $^{3}/_{16}$ stock	Biological sample E2
2	28	E3 – 2 x 3 $^{1}/_{2}$ inch plastic rings $^{3}/_{4}$ stock	Biological sample E3
2	29	E4 – 2 x 3 $^{7}/_{8}$ inch steel rings $^{3}/_{16}$ stock	Biological sample E4
	30-40	***Closed***	***Tagged***
3	41	E1 – rings sewn shut	Biological sample E1
3	42	E2 – 2 x 3 $^{1}/_{2}$ inch steel rings $^{3}/_{16}$ stock	Biological sample E2
3	43	E3 – 2 x 3 $^{1}/_{2}$ inch plastic rings $^{3}/_{4}$ stock	Biological sample E3
3	44	E4 – 2 x 3 $^{7}/_{8}$ inch steel rings $^{3}/_{16}$ stock	Biological sample E4
	45-55	***Closed***	***Tagged***
4	56	E1 – rings sewn shut	Biological sample E1
4	57	E2 – 2 x 3 $^{1}/_{2}$ inch steel rings $^{3}/_{16}$ stock	Biological sample E2
4	58	E3 – 2 x 3 $^{1}/_{2}$ inch plastic rings $^{3}/_{4}$ stock	Biological sample E3
4	59	E4 – 2 x 3 $^{7}/_{8}$ inch steel rings $^{3}/_{16}$ stock	Biological sample E4
	60-65	***Closed***	***Tagged***

Table 10. Summary of species captured during the 2005 survey standardized sets conducted at offshore indexing localities. No value in the count or weight columns indicates that the catch was not counted or weighed, respectively. Trace indicates a total weight of less than 1 kg.

Common name	Scientific name	Total count	Total weight (kg)
Round fish			
Sablefish	*Anoplopoma fimbria*	8,680	23,545
Pacific Grenadier	*Coryphaenoides acrolepis*	414	370
Giant Grenadier	*Albatrossia pectoralis*	140	648
Lingcod	*Ophiodon elongatus*	122	1,034
Snailfishes	Liparinae	41	21
Pacific Flatnose	*Antimora microlepis*	25	16
Spiny Dogfish	*Squalus acanthias*	21	95
Pacific Cod	*Gadus macrocephalus*	4	9
Threadfin Grenadier	*Coryphaenoides filifer*	2	2
Sculpins	Cottidae	1	trace
Skilfish	*Erilepis zonifer*	1	11
Rockfish			
Rougheye Rockfish	*Sebastes aleutianus*	445	725
Redbanded Rockfish	*Sebastes babcocki*	69	109
Shortspine Thornyhead	*Sebastolobus alascanus*	23	20
Rosethorn Rockfish	*Sebastes helvomaculatus*	21	7
Longspine Thornyhead	*Sebastolobus altivelis*	11	2
Yellowmouth Rockfish	*Sebastes reedi*	8	12
Shortraker Rockfish	*Sebastes borealis*	5	16
Sharpchin Rockfish	*Sebastes zacentrus*	4	2
Harlequin Rockfish	*Sebastes variegatus*	1	trace
Bocaccio	*Sebastes paucispinis*	1	6
Darkblotched Rockfish	*Sebastes crameri*	1	2
Redstripe Rockfish	*Sebastes proriger*	1	1
Flatfish			
Arrowtooth Flounder	*Atheresthes stomias*	675	1,457
Pacific Halibut	*Hippoglossus stenolepis*	54	457
Dover Sole	*Microstomus pacificus*	28	36
Invertebrates			
Grooved Tanner Crab	*Chionoecetes tanneri*	227	79
Red Queen Crab	*Lithodes couesi*	150	52
Gastropods	Gastropoda	125	8
Box Crabs	Lopholithodes	12	7
Paralomis multispina	*Paralomis multispina*	11	3
Starfish	Asteroidea	8	trace
Prawn	*Pandalus platyceros*	7	2
Sponges	Porifera	6	4
Brown King Crab	*Paralithodes brevipes*	3	5
Sea Urchins	Echinacea	3	
Red King Crab	*Paralithodes cammtschatica*	2	1
Octopus	Octopoda	2	2

Common name	Scientific name	Total count	Total weight (kg)
Vampire Squid	Vampyromorpha	1	1
Anemone	Actiniaria	1	trace
Hydroid	Hydrozoa	1	1
Segmented Worms	Annelida	1	
Anthozoa	Anthozoa		trace
Ophiuroidea	Ophiuroidea		trace
Sea Cucumbers	Holothuroidea		trace
Seaslugs	Nudibranchia		trace
Basket Stars	Euryalina		trace

Table 11. Summary of species captured during the 2005 survey standardized sets conducted at mainland inlet localities. No value in the count or weight columns indicates that the catch was not counted or weighed, respectively. Trace indicates a total weight of less than 1 kg.

Common name	Scientific name	Total count	Total weight(kg)
Round fish			
Sablefish	*Anoplopoma fimbria*	7,066	19,097
Walleye Pollock	*Theragra chalcogramma*	7	7
Spiny Dogfish	*Squalus acanthias*	6	10
Pacific Sleeper Shark	*Somniosus pacificus*	1	50
Flatfish			
Pacific Halibut	*Hippoglossus stenolepis*	72	517
Arrowtooth Flounder	*Atheresthes stomias*	23	47
Dover Sole	*Microstomus pacificus*	4	6
Invertebrates			
Octopus	Octopoda	1	1
Sweet Potato Sea Cucumber	*Molpadia intermedia*		trace
Gastropods	Gastropoda		trace
Sea Urchins	Echinacea		trace
Starfish	Asteroidea		trace

Table 12. Summary of species captured during the 2005 survey Type 1 tagging sets conducted at offshore indexing and offshore tagging localities. No value in the count or weight columns indicates that the catch was not counted or weighed, respectively. Trace indicates a total weight of less than 1 kg.

Common name	Scientific name	Total count	Total weight (kg)
Round fish			
Sablefish	*Anoplopoma fimbria*	12,620	34,530
Pacific Grenadier	*Coryphaenoides acrolepis*	2	3
Giant Grenadier	*Albatrossia pectoralis*	1	3
Rockfish			
Rougheye Rockfish	*Sebastes aleutianus*	96	149
Shortspine Thornyhead	*Sebastolobus alascanus*	15	22
Shortraker Rockfish	*Sebastes borealis*	14	36
Redbanded Rockfish	*Sebastes babcocki*	5	5
Flatfish			
Arrowtooth Flounder	*Atheresthes stomias*	138	256
Pacific Halibut	*Hippoglossus stenolepis*	6	25
Dover Sole	*Microstomus pacificus*	4	4
Invertebrates			
Oregontriton	*Fusitriton oregonensis*	276	16
Grooved Tanner Crab	*Chionoecetes tanneri*	122	76
Sea Urchins	Echinacea	45	2
Red Queen Crab	*Lithodes couesi*	15	7
Gastropods	Gastropoda	5	trace
Golden King Crab	*Lithodes aequispina*	2	2
Inshore Tanner Crab	*Chionoecetes bairdi*	1	1

Table 13. Summary of species captured during the 2005 survey Type 3 tagging sets (StRS design). No value in the count or weight columns indicates that the catch was not counted or weighed, respectively. Trace indicates a total weight of less than 1 kg.

Common Name	Scientific Name	Total count	Total weight (kg)
Round fish			
Sablefish	*Anoplopoma fimbria*	17,730	47,250
Spiny Dogfish	*Squalus acanthias*	465	1,050
Pacific grenadier	*Coryphaenoides acrolepis*	399	338
Lingcod	*Ophiodon elongatus*	128	1,096
Giant grenadier	*Albatrossia pectoralis*	97	443
Snailfishes	Liparinae	25	14
Pacific Flatnose	*Antimora microlepis*	11	8
Pacific Cod	*Gadus macrocephalus*	5	10
Spotted Ratfish	*Hydrolagus colliei*	2	2
Pacific Sleeper Shark	*Somniosus pacificus*	1	40
Popeye grenadier	*Coryphaenoides cinereus*	1	trace
Twoline Eelpout	*Bothrocara brunneum*	1	trace
Rockfish			
Rougheye Rockfish	*Sebastes aleutianus*	166	282
Redbanded Rockfish	*Sebastes babcocki*	113	176
Shortspine Thornyhead	*Sebastolobus alascanus*	36	47
Yelloweye Rockfish	*Sebastes ruberrimus*	33	98
Shortraker Rockfish	*Sebastes borealis*	14	49
Rosethorn Rockfish	*Sebastes helvomaculatus*	4	1
Yellowmouth Rockfish	*Sebastes reedi*	3	4
Aurora Rockfish	*Sebastes aurora*	2	1
Silvergray Rockfish	*Sebastes brevispinis*	2	4
Greenstriped Rockfish	*Sebastes elongatus*	1	trace
Longspine Thornyhead	*Sebastolobus altivelis*	1	trace
Unidentified Rockfish	Sebastes spp.	1	trace
Bocaccio	*Sebastes paucispinis*	1	5
Flatfish			
Arrowtooth Flounder	*Atheresthes stomias*	598	1,169
Pacific Halibut	*Hippoglossus stenolepis*	114	937
Dover Sole	*Microstomus pacificus*	7	13
Deepsea Sole	*Embassichthys bathybius*	2	1
Invertebrates			
Grooved Tanner Crab	*Chionoecetes tanneri*	1,400	414
Oregontriton	*Fusitriton oregonensis*	283	15
Sea Urchins	Echinacea	220	21
Red Queen Crab	*Lithodes couesi*	174	68
Paralomis multispina	*Paralomis multispina*	71	29
Box Crabs	Lopholithodes	55	31
Gastropods	Gastropoda	53	3
Starfish	Asteroidea	15	3
Tanner Crabs	Chionoecetes	4	2

Common Name	Scientific Name	Total count	Total weight (kg)
Prawn	*Pandalus platyceros*	4	trace
Heart Urchins	Atelostomata	3	trace
Golden King Crab	*Lithodes aequispina*	2	1
Octopus	Octopoda	1	2
True Crabs	Brachyura	1	trace
Sea Cucumbers	Holothuroidea	1	trace
Ascidians And Tunicates	Ascidiacea	1	trace
Anemone	Actiniaria	1	2
Solasteridae	Solasteridae	1	
Dogwhelks	Nassariidae	1	

Table 14. Summary of the number of sablefish recovered, tagged, and sampled during the traditional component of the 2005 survey.

		Number of sablefish		Number of sablefish sampled for						
	Locality	Tagged	Recovered	Fork length	Girth	Sex	Maturity	Otoliths	Weight	Total
Offshore indexing	Langara Island-N. Frederick	242	2	406	123	406	406	180	180	650
	Hippa Island	507	7	627	127	626	627	240	240	1,141
	Buck Point	334	5	658	150	657	656	240	240	997
	Gowgaia Bay	317	9	653	95	653	653	254	254	979
	Cape St. James	295	9	828	120	828	828	306	306	1,132
	Triangle Island	318	5	781	113	780	780	292	292	1,104
	Quatsino Sound	333	3	660	183	662	662	260	260	996
	Esperanza Inlet	311	6	812	161	812	812	316	316	1,129
	Barkley Canyon	470	10	913	150	913	913	337	337	1,393
	Total	**3,127**	**56**	**6,338**	**1,222**	**6,337**	**6,337**	**2,425**	**2,425**	**9,521**
Offshore tagging	Tasu Sound	905	1	130	129	130	129	0	0	1,036
	Middle Ground	889	16	132	131	132	132	0	0	1,037
	Pisces Canyon	823	4	107	108	108	108	0	0	934
	Estevan Point	970	27	156	156	156	156	0	0	1,153
	Father Charles Canyon	551	1	137	137	137	137	0	0	689
	Total	**4,138**	**49**	**662**	**661**	**663**	**662**	**0**	**0**	**4,849**
Mainland Inlet	Portland Inlet	619	5	206	0	206	206	206	206	830
	Gil Island	1,130	13	247	0	247	247	247	247	1,390
	Finlayson Channel	1,146	34	264	0	264	264	264	264	1,444
	Dean/Burke Channel	568	27	220	0	220	220	220	220	815
	Total	**3,463**	**79**	**937**	**0**	**937**	**937**	**937**	**937**	**4,479**
Traditional survey total		**10,728**	**184**	**7,937**	**1,883**	**7,937**	**7,936**	**3,362**	**3,362**	**18,849**

Table 15. Summary of sablefish recovered, tagged, and sampled during the stratified random design component of the 2005 survey.

Stratum		Number of sablefish		Number of sablefish sampled for					
Spatial	**Depth**	**Tagged**	**Recovered**	**Fork length**	**Sex**	**Maturity**	**Otoliths**	**Weight**	**Total**
S_1	RD_1	461	3	215	215	215	215	215	679
	RD_2	700	5	265	265	264	265	213	970
	RD_3	564	11	335	335	333	335	269	910
	All	**1,725**	**19**	**815**	**815**	**812**	**815**	**697**	**2,559**
S_2	RD_1	280	2	175	175	174	175	154	457
	RD_2	512	4	263	263	263	263	52	779
	RD_3	313	3	204	203	202	204	150	520
	All	**1,105**	**9**	**642**	**641**	**639**	**642**	**356**	**1,756**
S_3	RD_1	140	1	156	156	149	156	45	297
	RD_2	810	6	249	249	248	249	147	1,065
	RD_3	275	2	268	268	268	268	100	545
	All	**1,225**	**9**	**673**	**673**	**665**	**673**	**292**	**1,907**
S_4	RD_1	152	0	104	104	104	104	62	256
	RD_2	605	6	209	209	209	209	208	820
	RD_3	186	4	241	241	241	241	180	431
	All	**943**	**10**	**554**	**554**	**554**	**554**	**450**	**1,507**
S_5	RD_1	35	0	85	85	85	85	27	120
	RD_2	576	14	264	265	265	266	127	854
	RD_3	143	1	219	219	219	219	146	363
	All	**754**	**15**	**568**	**569**	**569**	**570**	**300**	**1,337**
All	**RD_1**	**1,068**	**6**	**735**	**735**	**727**	**735**	**503**	**1,809**
	RD_2	**3,203**	**35**	**1,250**	**1,251**	**1,249**	**1,252**	**747**	**4,488**
	RD_3	**1,481**	**21**	**1,267**	**1,266**	**1,263**	**1,267**	**845**	**2,769**
	All	**5,752**	**62**	**3,252**	**3,252**	**3,239**	**3,254**	**2,095**	**9,066**

Table 16. Summary of biological data collected during the 2005 traditional survey excluding recovered tagged fish.

		Mean fork length (mm)				Proportion	
	Locality	**Males**	**Females**	**Sexes combined**	**Tagged**	**males**	**females**
Offshore indexing	Langara Island-North Frederick	595	660	637	632	0.35	0.65
	Hippa Island	582	639	621	636	0.32	0.68
	Buck Point	605	670	643	607	0.42	0.58
	Gowgaia Bay	592	666	637	641	0.39	0.61
	Cape St. James	587	658	627	622	0.44	0.56
	Triangle Island	580	668	627	632	0.46	0.54
	Quatsino Sound	592	651	626	617	0.42	0.58
	Esperanza Inlet	574	654	618	634	0.45	0.55
	Barkley Canyon	589	664	638	622	0.34	0.66
	Mean	**588**	**659**	**630**	**627**	**0.40**	**0.60**
Offshore tagging	Tasu Sound	596	661	641	629	0.32	0.68
	Middle Ground	581	657	613	592	0.58	0.42
	Pisces Canyon	637	659	651	645	0.40	0.60
	Estevan Point	601	667	639	613	0.42	0.58
	Father Charles Canyon	633	696	664	632	0.51	0.49
	Mean	**610**	**668**	**642**	**622**	**0.45**	**0.55**
Mainland inlet	Portland Inlet	561	605	590	604	0.33	0.67
	Gil Island	593	653	629	623	0.40	0.60
	Finlayson Channel	586	638	623	623	0.27	0.73
	Dean/Burke Channel	546	603	583	579	0.35	0.65
	Mean	**572**	**625**	**606**	**607**	**0.34**	**0.66**

Table 17. Summary of biological data collected during the 2005 random survey excluding recovered tagged fish.

Stratum		Mean fork length (mm)				Proportion	
Spatial	**Depth**	**Males**	**Females**	**Sexes combined**	**Tagged**	**males**	**females**
S_1	RD_1	573	651	627	633	0.31	0.69
	RD_2	574	652	604	609	0.61	0.39
	RD_3	556	631	602	590	0.39	0.61
	All	**568**	**645**	**611**	**611**	**0.44**	**0.56**
S_2	RD_1	615	675	661	654	0.23	0.77
	RD_2	597	667	616	623	0.72	0.28
	RD_3	582	630	604	612	0.54	0.46
	All	**598**	**657**	**627**	**630**	**0.50**	**0.50**
S_3	RD_1	628	697	680	690	0.19	0.81
	RD_2	591	660	622	599	0.54	0.46
	RD_3	615	683	659	650	0.35	0.65
	All	**611**	**680**	**654**	**646**	**0.36**	**0.64**
S_4	RD_1	616	690	668	652	0.30	0.70
	RD_2	607	660	630	632	0.56	0.44
	RD_3	612	716	678	665	0.37	0.63
	All	**612**	**689**	**659**	**650**	**0.41**	**0.59**
S_5	RD_1	574	654	615	629	0.48	0.52
	RD_2	563	639	589	594	0.66	0.34
	RD_3	621	676	647	650	0.52	0.48
	All	**586**	**656**	**617**	**624**	**0.55**	**0.45**
All	**RD_1**	**601**	**673**	**650**	**652**	**0.30**	**0.70**
	RD_2	**586**	**656**	**612**	**611**	**0.62**	**0.38**
	RD_3	**597**	**667**	**638**	**633**	**0.43**	**0.57**
	All	**595**	**665**	**633**	**632**	**0.45**	**0.55**

Table 18. Summary of sablefish catch rates by escape ring study treatment. The average number and weight (kg) per trap are shown by set and treatment. Catch rates were included in the summary only for those traps that were fishing correctly.

Number per trap

	Treatment					
Set Number	**E1**	**E2**	**E3**	**E4**	**Tagging**	**All**
6	16.75		21.00	10.25	19.20	18.53
7	8.00		8.00	10.67	11.30	10.81
14	15.00		15.00	10.50	23.43	21.48
19	16.25		21.25	5.33	20.91	19.72
30	20.33	19.33	9.75	11.75	16.45	16.05
33	17.50	6.67	8.75	6.00	18.00	16.27
37	8.00	12.50	10.75	4.75	12.81	11.86
42	15.25	8.33	14.75	4.50	19.25	17.25
47	17.50	9.50	8.25	8.33	17.55	16.20
61	14.25	4.00	6.75	3.50	12.14	10.83
65	17.33	12.50	12.67	0.00	16.96	16.26
70	14.67	15.00	11.75	7.75	14.88	13.59
76	9.75	4.75	7.75	7.67	10.73	9.92
86	6.33	3.00	12.67	8.33	14.42	12.68
All	**14.02**	**10.03**	**12.06**	**7.64**	**16.57**	**15.3**

Weight (kg) per trap

	Treatment					
Set Number	**E1**	**E2**	**E3**	**E4**	**Tagging**	**All**
6	47.20		64.38	34.95	51.87	51.23
7	25.08		25.05	39.53	32.24	31.63
14	40.67		42.97	34.28	59.71	55.69
19	48.10		65.15	19.20	59.78	57.06
30	43.30	55.57	25.62	37.83	42.87	42.08
33	49.42	21.73	27.38	19.57	51.99	47.28
37	24.12	39.32	36.08	15.78	34.14	32.81
42	33.78	19.60	38.60	14.08	41.42	37.98
47	47.18	28.10	24.30	25.43	44.28	41.66
61	46.05	15.77	22.02	12.80	37.11	33.84
65	53.93	44.80	35.57	0.00	47.32	46.07
70	39.03	43.97	34.80	22.50	35.64	35.25
76	28.62	14.10	22.00	25.00	31.70	29.34
86	20.73	10.50	41.00	30.33	42.06	38.12
All	**39.07**	**30.48**	**35.98**	**25.34**	**44.36**	**41.76**

Table 19. Mixed effects linear model results for the escape ring experiment. The overall F-statistic for the fixed treatment effect, estimated variances, and treatment contrasts relative to treatment level E3 (steel 3 $^1/_2$ inch ring) are listed.

Model	Treatment Effect	$\widehat{\sigma_b^2}$	$\widehat{\sigma_2}$	Lower 95 % CI	Fixed Effect Estimate	Upper 95 % CI
Catch rate (square root number per trap)	$F_{3,162} = 8.75,\ p < 0.0001$	0.1266	1.020			
Intercept				***3.286***	***3.620***	***3.955***
E2 (Steel 3 $^1/_2$ inch)				-1.0460	-0.5746	-0.1033
E3 (Plastic 3 $^1/_2$ inch)				-0.7151	-0.3275	0.0601
E4 (Steel 3 $^7/_8$ inch)				-1.4500	-1.0395	-0.6289
Catch rate (square root kg per trap)	$F_{3,162} = 5.122,\ p < 0.0021$	0.3123	2.972			
Intercept				***5.521***	***6.078***	***6.635***
E2 (Steel 3 $^1/_2$ inch)				-1.523	-0.719	0.084
E3 (Plastic 3 $^1/_2$ inch)				-1.048	-0.386	0.276
E4 (Steel 3 $^7/_8$ inch)				-2.051	-1.350	-0.650
Fork length (mm)	$F_{3,1870} = 18.68,\ p < 0.0001$	154.9	3596			
Intercept				***621.74***	***629.91***	***638.07***
E2 (Steel 3 $^1/_2$ inch)				2.79	10.30	17.82
E3 (Plastic 3 $^1/_2$ inch)				6.22	13.45	20.69
E4 (Steel 3 $^7/_8$ inch)				22.35	30.36	38.38
Girth (mm)	$F_{3,1866} = 25.587,\ p < 0.0001$	77.79	1439			
Intercept				***314.8***	***320.4***	***326.0***
E2 (Steel 3 $^1/_2$ inch)				4.15	8.91	13.68
E3 (Plastic 3 $^1/_2$ inch)				4.68	9.26	13.84
E4 (Steel 3 $^7/_8$ inch)				17.57	22.64	27.71

Table 20. Summary of sablefish biological sampling from escape ring treatment traps during Type 1 tagging sets during the 2005 survey. The number of sablefish sampled and the sex ratio (percent males) is shown by treatment and set number.

	Number of sablefish sampled					Proportion of males				
Set	**E1**	**E2**	**E3**	**E4**	**All**	**E1**	**E2**	**E3**	**E4**	**All**
6	41	39	55	16	151	0.68	0.67	0.69	0.62	0.68
7	31	30	32	44	137	0.45	0.67	0.50	0.45	0.51
14	43	40	41	32	156	0.47	0.42	0.49	0.28	0.42
19	48	41	55	17	161	0.60	0.39	0.42	0.35	0.46
30	50	51	41	41	183	0.56	0.37	0.56	0.34	0.46
33	53	20	19	16	108	0.43	0.45	0.21	0.44	0.40
37	26	40	32	16	114	0.42	0.36	0.25	0.31	0.34
42	54	18	45	15	132	0.72	0.56	0.49	0.33	0.58
47	42	32	19	27	120	0.55	0.66	0.63	0.59	0.60
61	50	6	23	16	95	0.38	0.17	0.39	0.12	0.33
65	40	27	31	32	130	0.35	0.31	0.26	0.34	0.32
70	44	46	38	22	150	0.41	0.37	0.29	0.45	0.37
76	41	19	31	37	128	0.34	0.26	0.42	0.24	0.32
86	21	39	38	25	123	0.43	0.56	0.39	0.36	0.45
All	**584**	**448**	**500**	**356**	**1,888**	**0.48**	**0.44**	**0.43**	**0.37**	**0.45**

Table 21. Summary of sablefish biological data from escape ring treatment traps during Type 1 tagging sets. The average fork length and girth in mm is shown by treatment and set number

	Average fork length (mm)					Average girth (mm)				
Set	**E1**	**E2**	**E3**	**E4**	**All**	**E1**	**E2**	**E3**	**E4**	**All**
6	626	631	639	668	626	341	338	349	373	346
7	655	652	653	686	638	325	329	331	353	336
14	625	645	632	661	617	321	343	343	368	342
19	635	643	634	670	636	328	330	326	350	330
30	614	640	629	651	623	310	326	319	331	321
33	638	673	654	658	646	319	343	329	331	327
37	650	657	688	688	642	334	333	348	347	339
42	592	613	625	656	594	300	318	320	372	318
47	639	637	641	664	628	320	320	314	327	321
61	650	665	643	656	643	329	355	318	340	330
65	639	649	635	642	630	315	326	313	318	317
70	616	629	655	624	614	301	325	335	316	319
76	617	632	626	650	635	320	326	325	334	326
86	631	617	654	671	635	333	322	336	355	335
All	**630**	**642**	**643**	**660**	**629**	**321**	**331**	**329**	**344**	**329**

Table 22. Summary of the number of traps with sablefish stuck in the escape rings by treatment and set. Treatments are arranged in rows and each column is a set. Each cell shows the number of traps without a fish in the escape rings followed in parentheses by the number of traps with a fish in one of the escape rings.

	Set														
Treatment	**6**	**7**	**14**	**19**	**30**	**33**	**37**	**42**	**47**	**61**	**65**	**70**	**76**	**86**	**Total**
E1	4 (0)	4 (0)	4 (0)	4 (0)	4 (0)	4 (0)	4 (0)	4 (0)	4 (0)	4 (0)	3 (0)	4 (0)	4 (0)	3 (0)	54 (0)
E2	4 (0)	4 (0)	4 (0)	4 (0)	4 (0)	3 (1)	4 (0)	3 (1)	3 (1)	3 (1)	3 (0)	4 (0)	4 (0)	1 (2)	48 (6)
E3	4 (0)	4 (0)	4 (0)	4 (0)	4 (0)	4 (0)	4 (0)	4 (0)	4 (0)	4 (0)	3 (0)	4 (0)	4 (0)	3 (0)	54 (0)
E4	4 (0)	4 (0)	4 (0)	4 (0)	4 (0)	3 (1)	4 (0)	4 (0)	3 (1)	2 (2)	1 (2)	4 (0)	3 (1)	3 (0)	47 (7)
Total	**16 (0)**	**16 (0)**	**16 (0)**	**16 (0)**	**16 (0)**	**14 (2)**	**16 (0)**	**15 (1)**	**14 (2)**	**13 (3)**	**10 (2)**	**16 (0)**	**15 (1)**	**10 (2)**	**203 (13)**

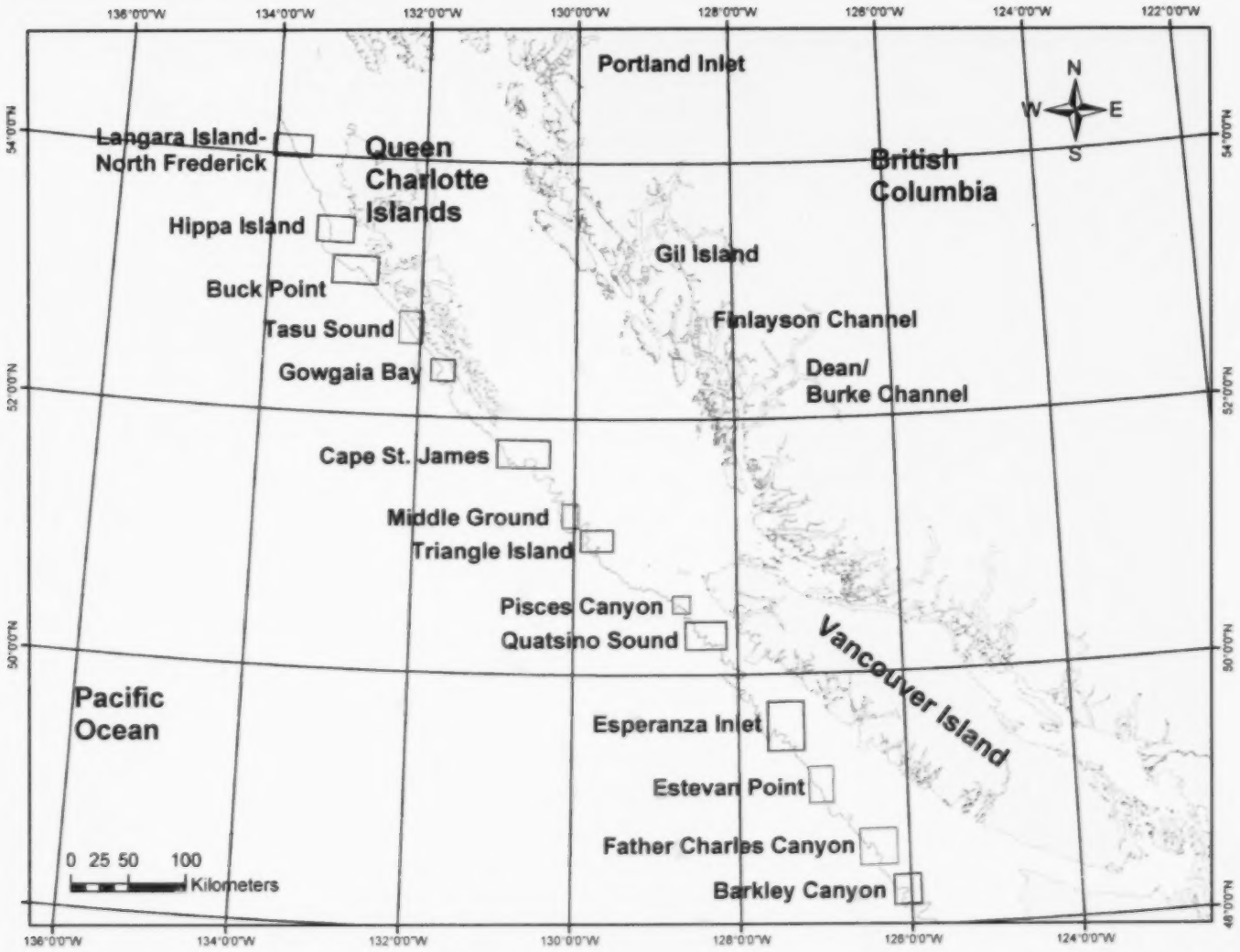

Figure 1. Geographic boundaries of the traditional survey localities. Blue boxes indicate an indexing locality, tagging localities are indicated by red boxes and green boxes indicate the locations within the mainland inlet localities. The 1000 m depth contour is shown.

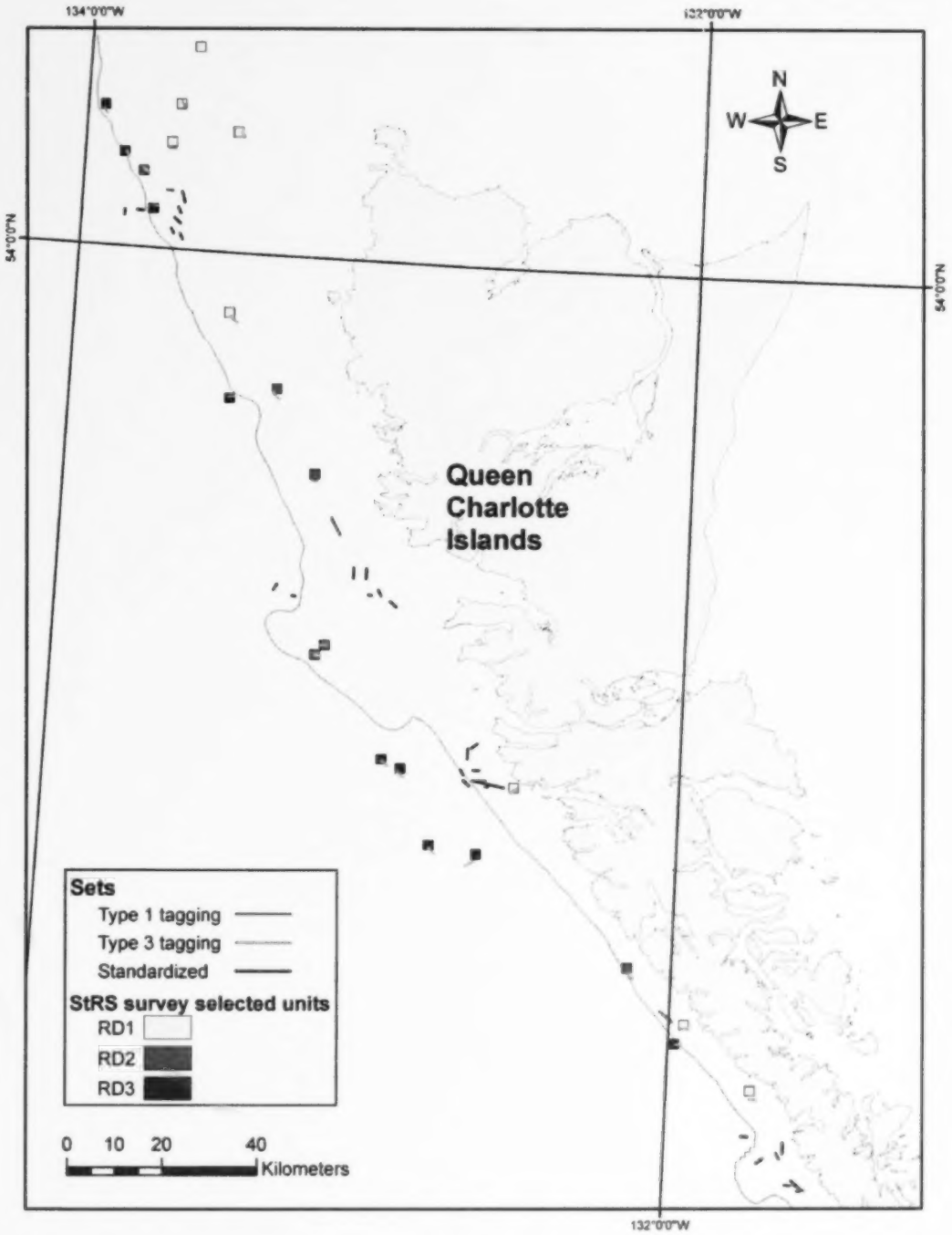

Figure 2. Locations of north coast sets completed during the 2005 survey. Blue lines represent standardized survey sets, red lines represent Type 1 tagging sets, and green lines represent the achieved locations of the StRS design sets. The grey squares indicate the 2 km by 2 km sampling units selected for the StRS design and the degree of shading indicates the target depth stratum. The 1000 m contour is shown.

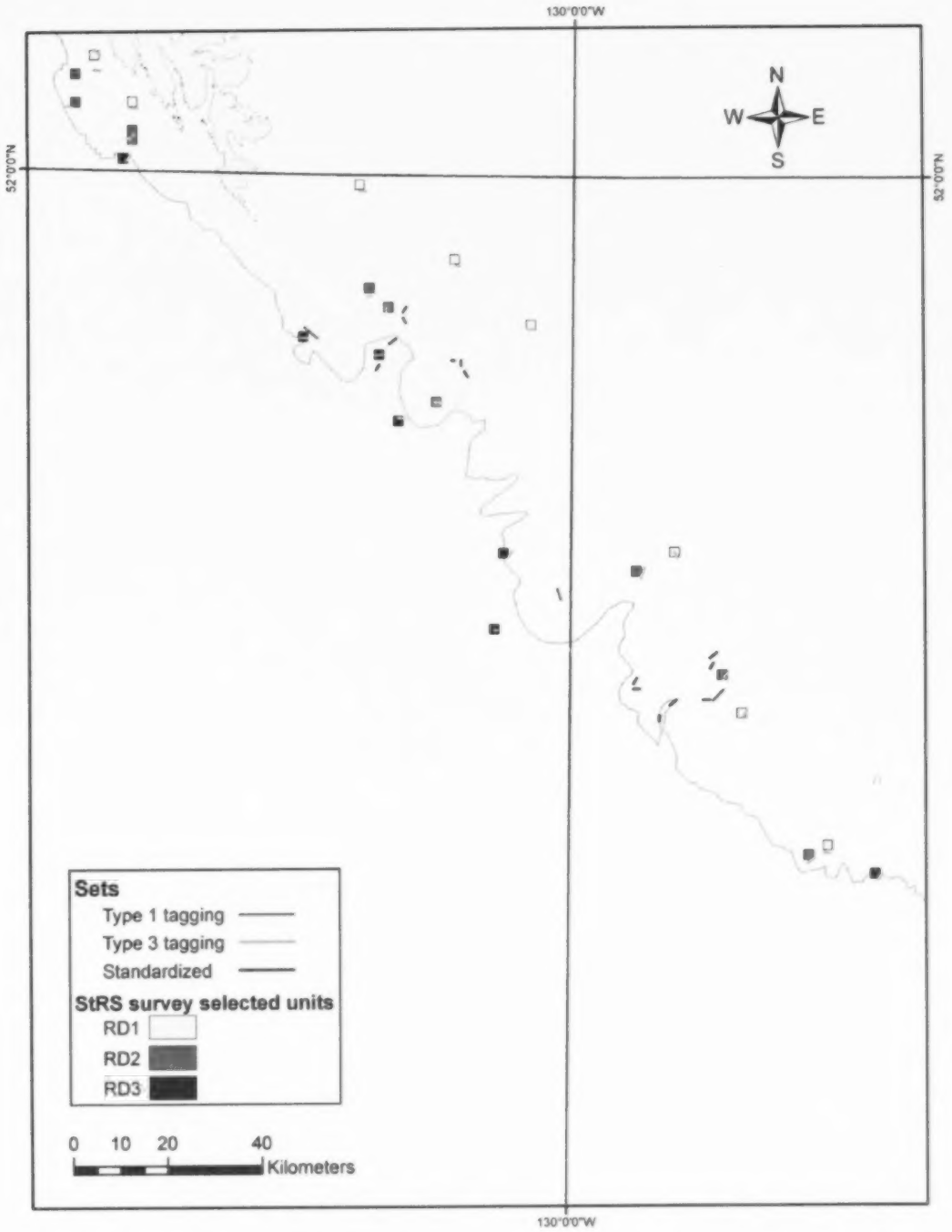

Figure 3. Locations of central coast sets completed during the 2005 survey. Blue lines represent standardized survey sets, red lines represent Type 1 tagging sets, and green lines represent the achieved locations of the StRS design sets. The grey squares indicate the 2 km by 2 km sampling units selected for the StRS design and the degree of shading indicates the target depth stratum. The 1000 m contour is shown.

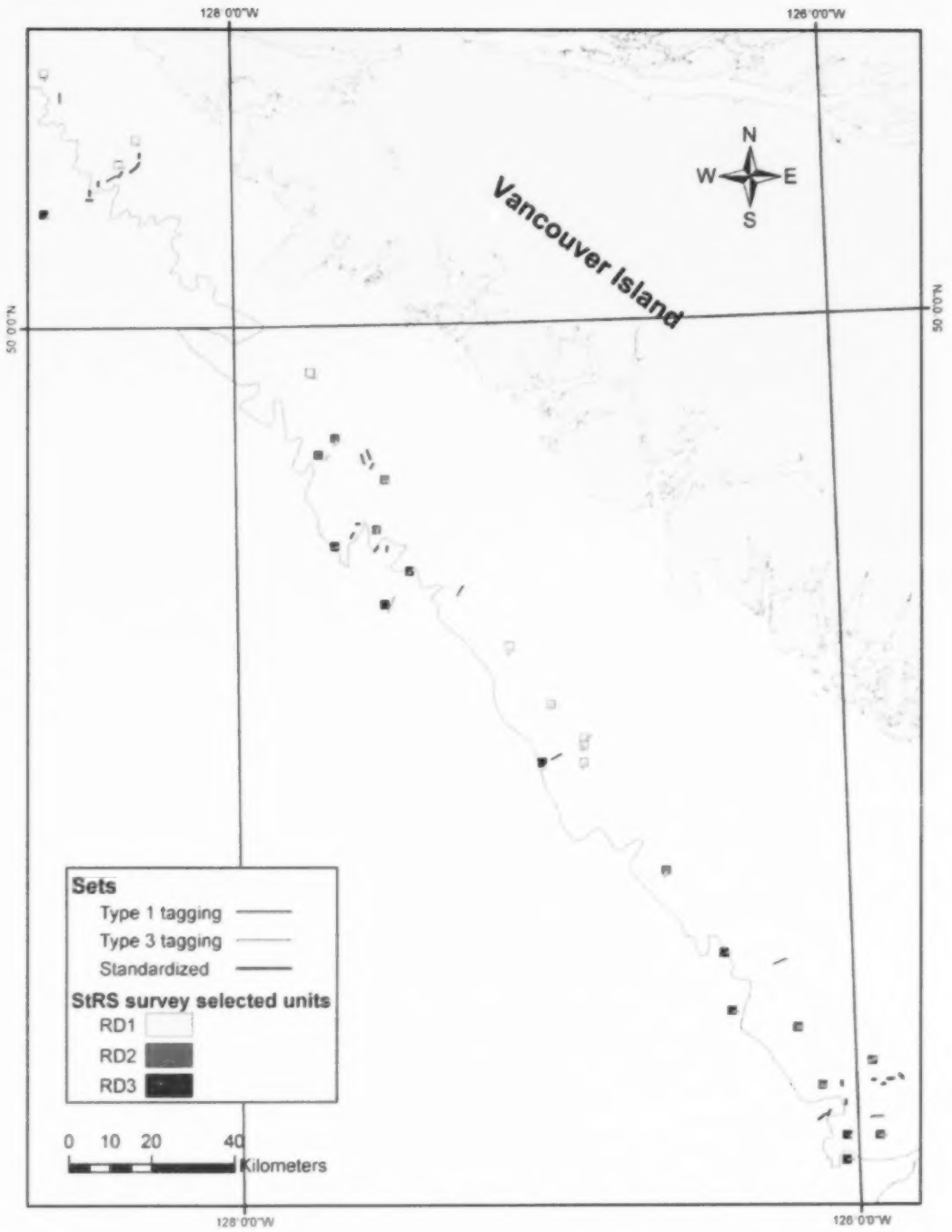

Figure 4. Locations of south coast sets completed during the 2005 survey. Blue lines represent standardized survey sets, red lines represent Type 1 tagging sets, and green lines represent the achieved locations of the StRS design sets. The grey squares indicate the 2 km by 2 km sampling units selected for the StRS design and the degree of shading indicates the target depth stratum. The 1000 m contour is shown.

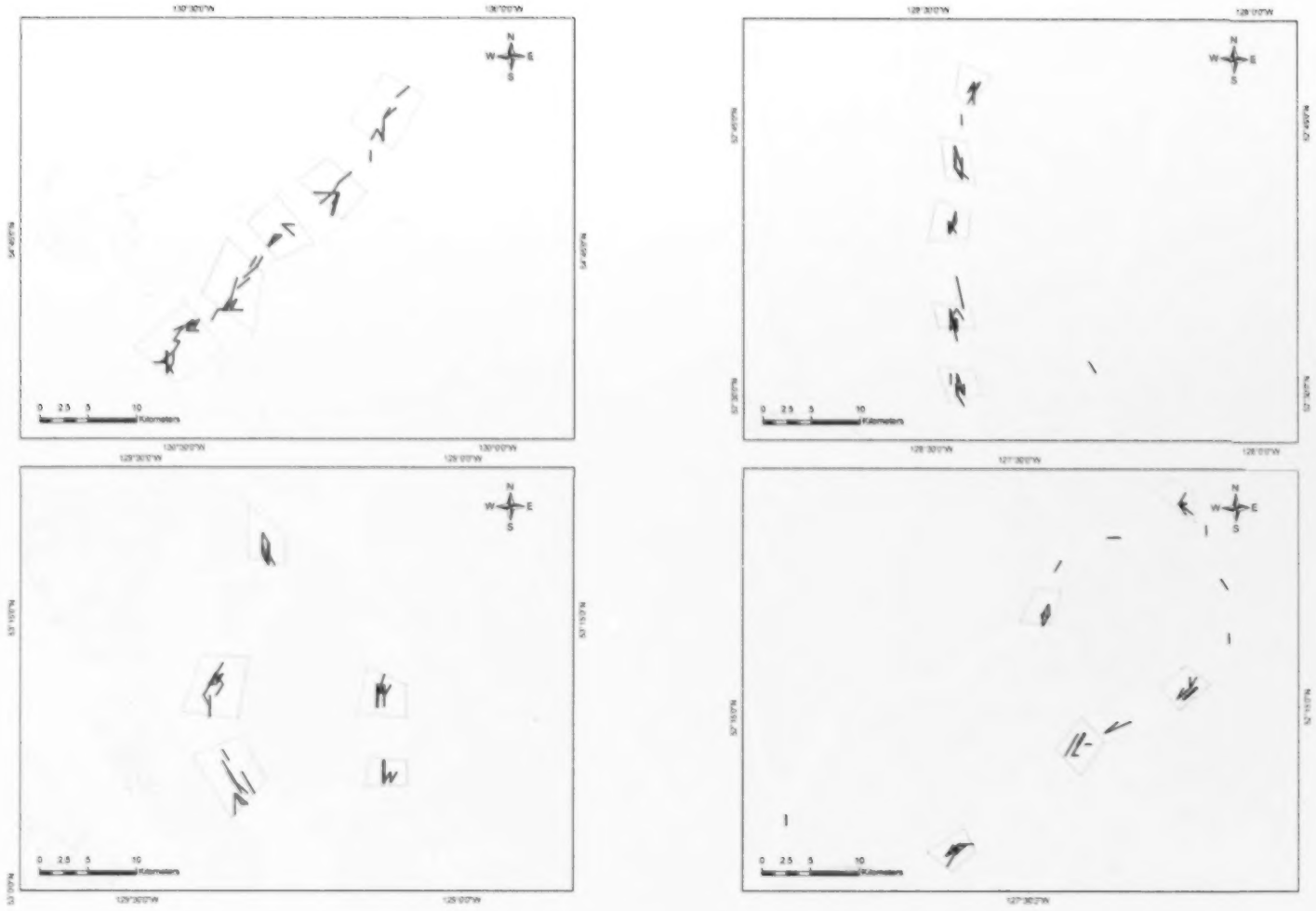

Figure 5. Sablefish survey mainland inlet localities. Figure panels show Portland Inlet (top left), Gil Island (bottom left), Finlayson Channel (top right) and Dean/Burke Channel (bottom right). Sets conducted from 1994 to 2004 are shown in black while the 2005 sets are shown in blue. The green polygons indicate the five specific set locations within each of the four localities.

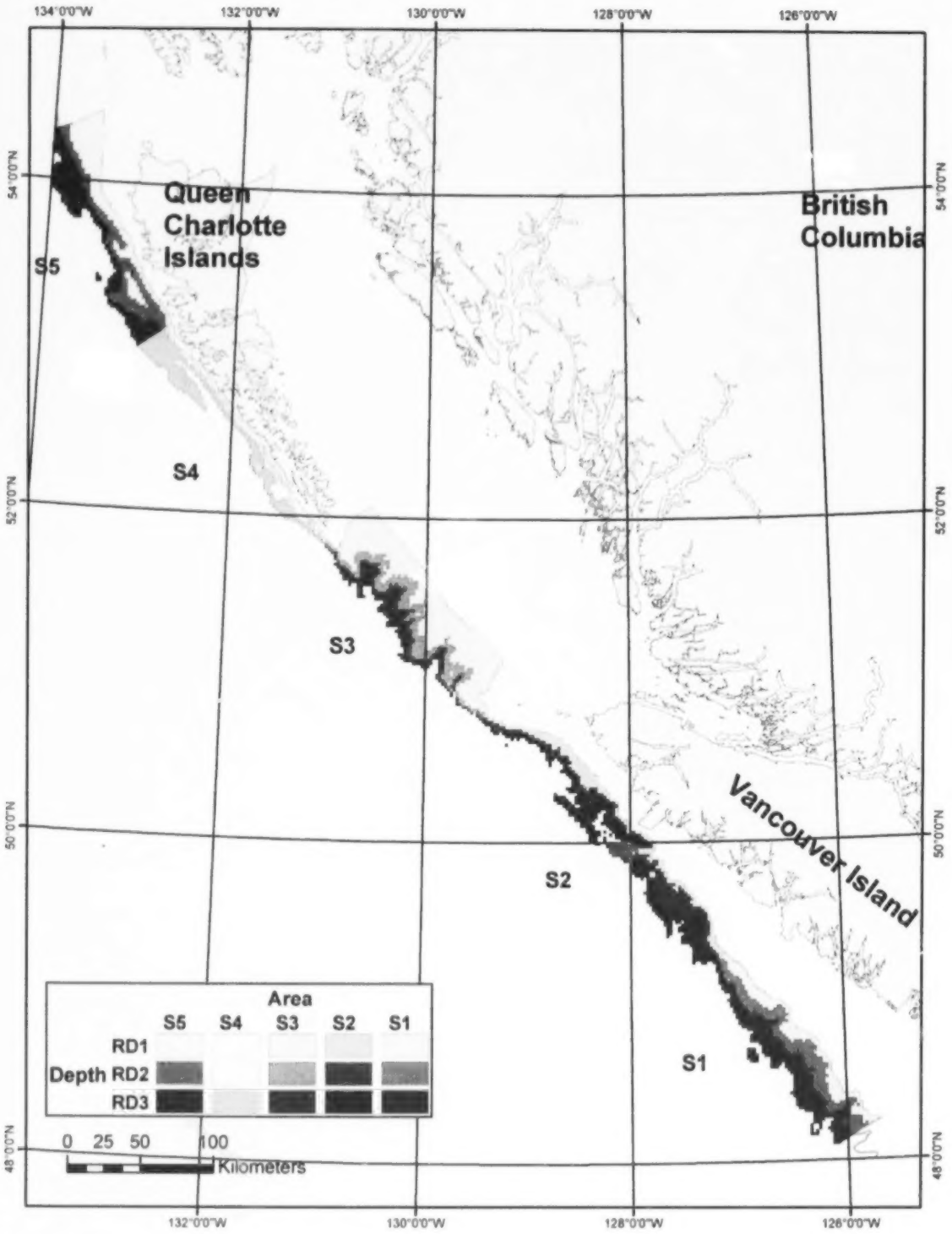

Figure 6. The stratified random sampling survey design. The boundaries of the 5 spatial strata (S_1-S_5) and the three depth strata (RD_1-RD_3) are shown.

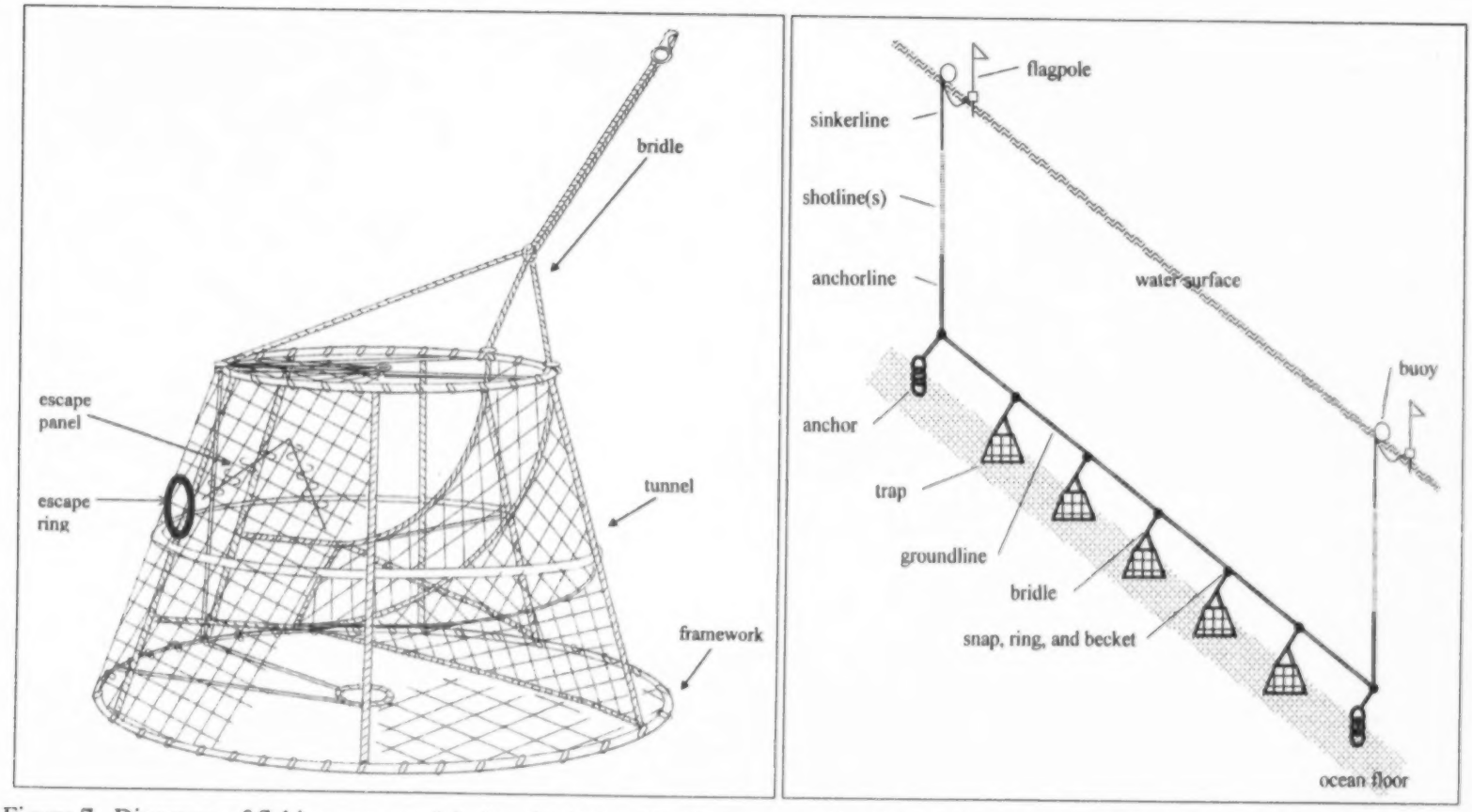

Figure 7. Diagrams of fishing gear used during the 2005 sablefish survey. The left panel shows a modified Korean trap of the kind used for survey fishing. The right panel shows a diagrammatic representation of the components of a set, or string, of trap gear.

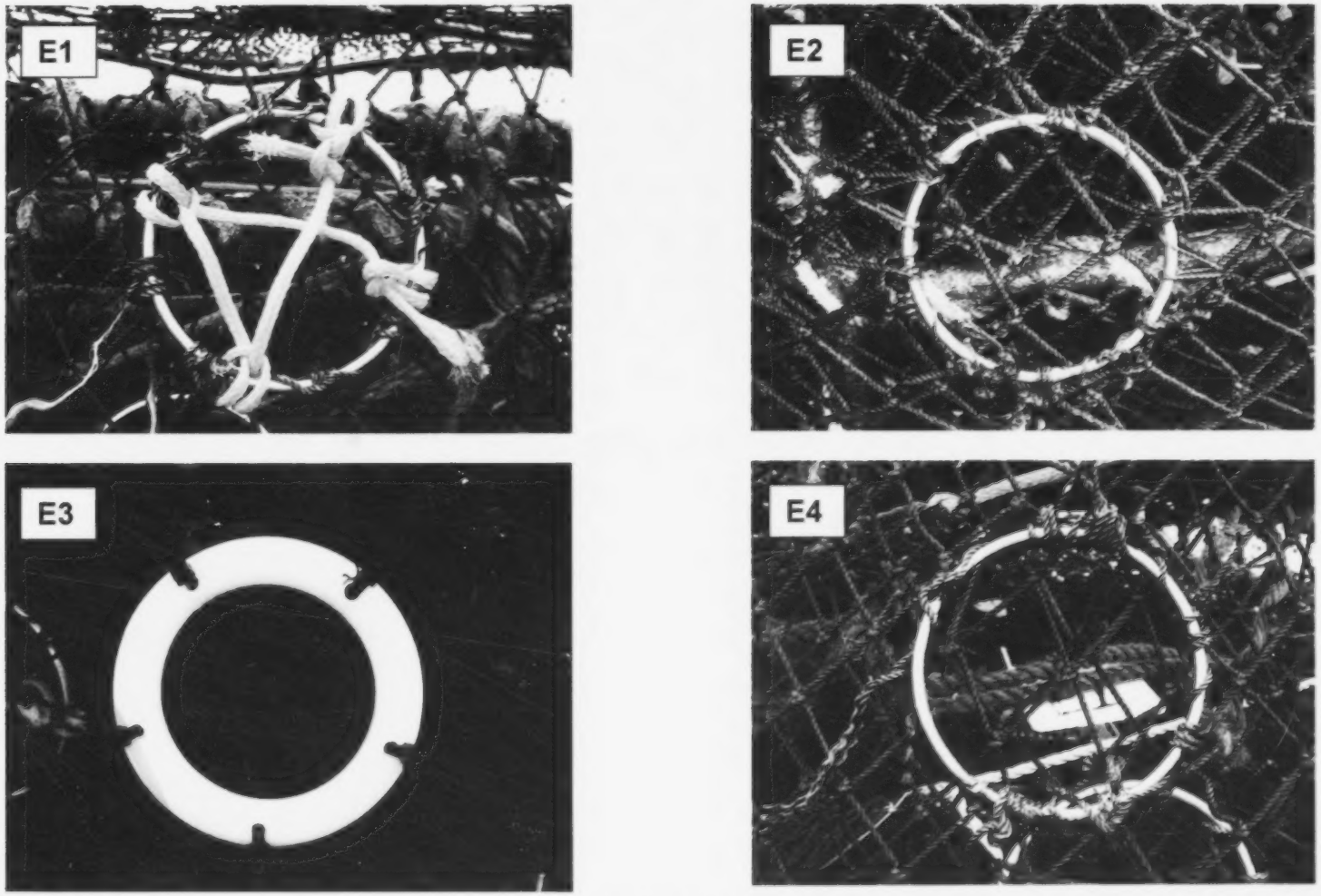

Figure 8. Escape ring experiment treatment levels: E1 – steel rings closed, E2 - 3 $^{1}/_{2}$ inch (89 mm) steel rings, E3 - 3 $^{1}/_{2}$ inch (89 mm) plastic rings, and E4 – 3 $^{7}/_{8}$ inch (98 mm) steel rings. All dimensions indicate inside ring diameter.

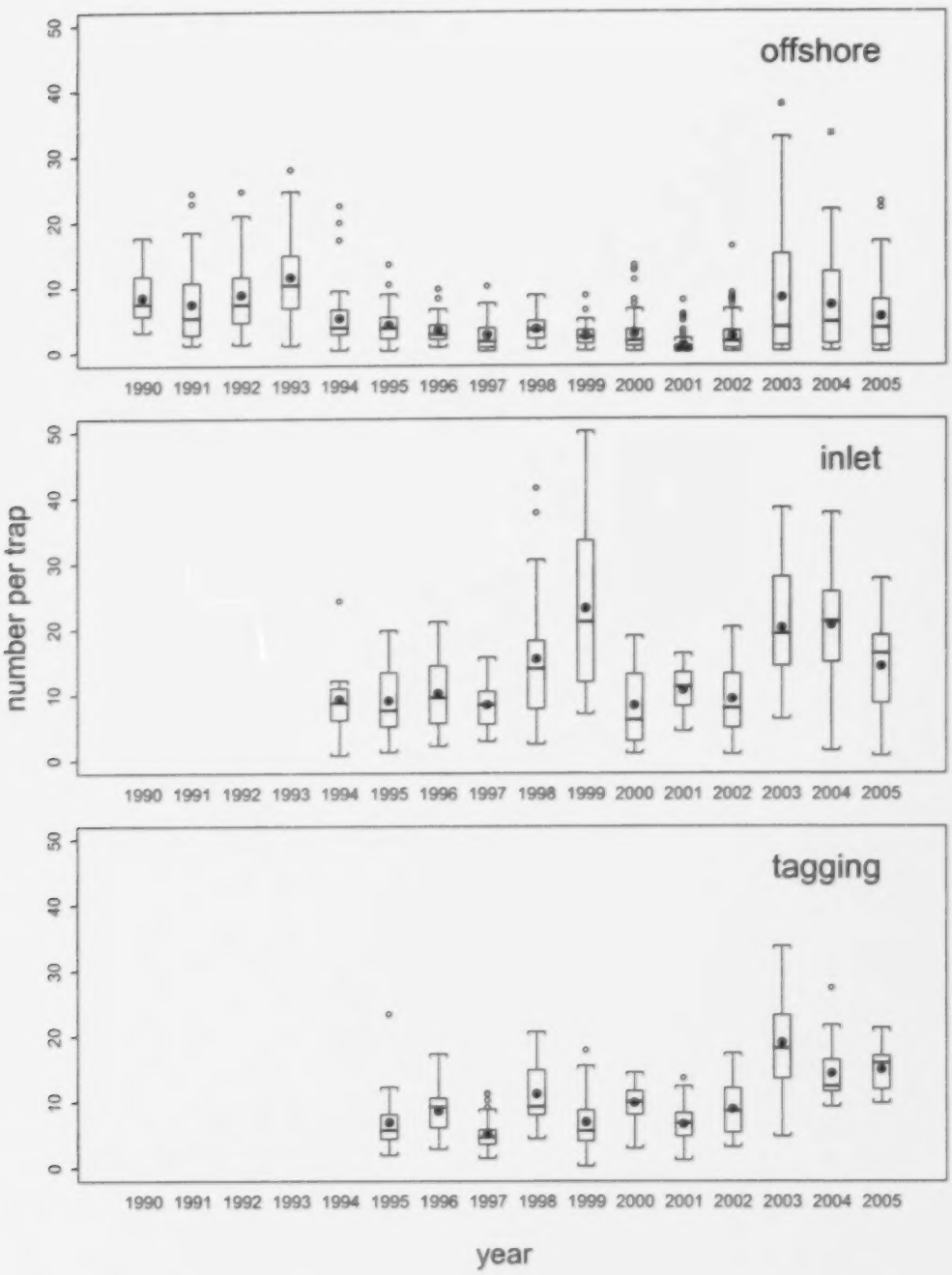

Figure 9. Boxplots of the annual distributions of catch rates for standardized sets conducted at **Offshore** indexing localities, standardized sets conducted at mainland **Inlet** localities, and Type 1 tagging sets conducted at both offshore **Tagging** and indexing localities. The filled circles show the mean annual catch rates. The shaded rectangles indicate an approximate 95 percent confidence interval on the median annual catch rate.

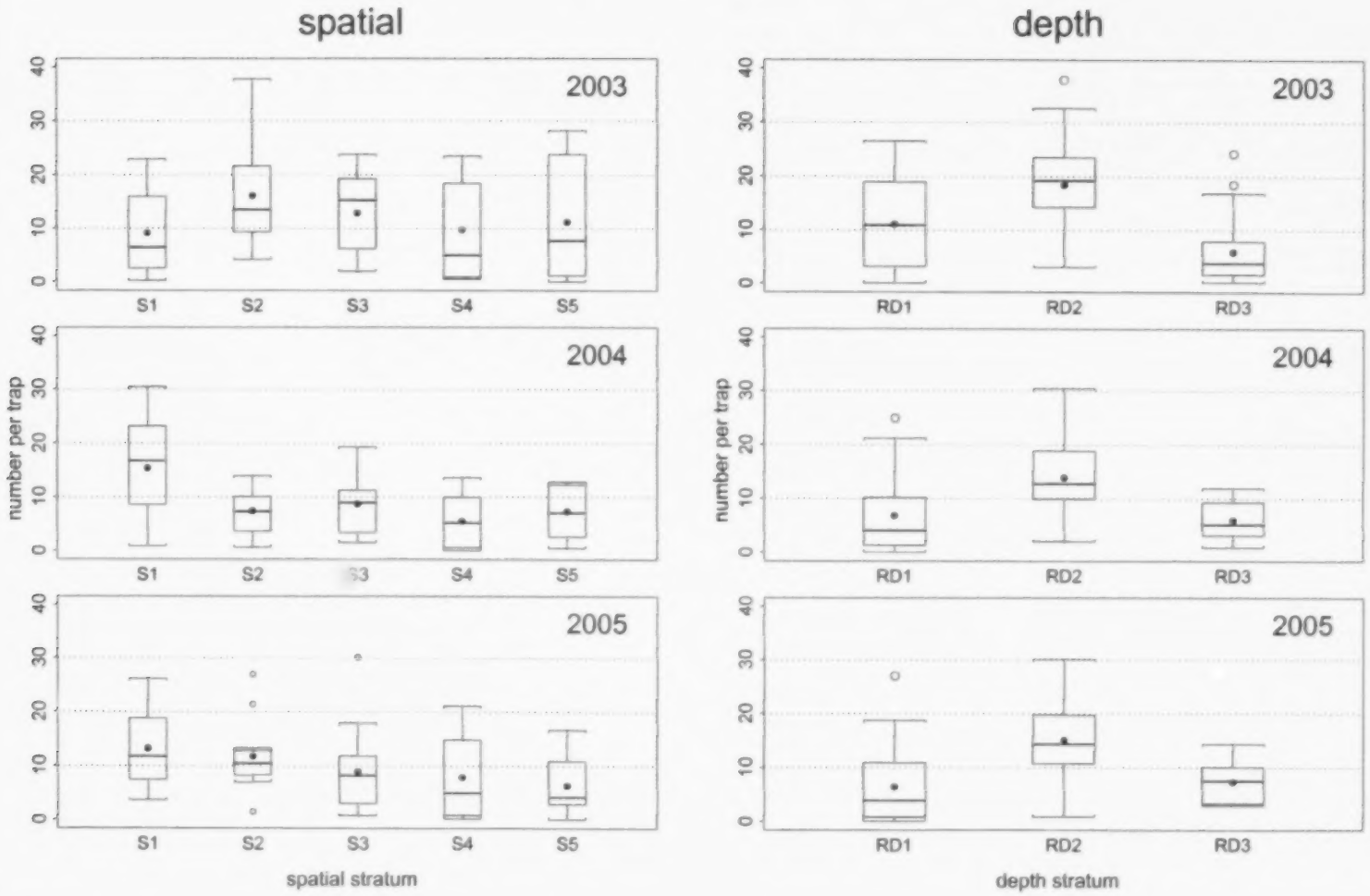

Figure 10. Distribution of catch rates for Type 3 tagging sets summarised by a boxplot for each spatial and depth stratum by year. The panels on the left show catch rates grouped by spatial strata from south to north (S_1-S_5). The panels on the right show catch rates grouped by depth strata from shallow to deep (RD_1-RD_3). The filled circles show the mean stratum catch rates. The shaded rectangles indicate an approximate 95 percent confidence interval on the median catch rate for the stratum.

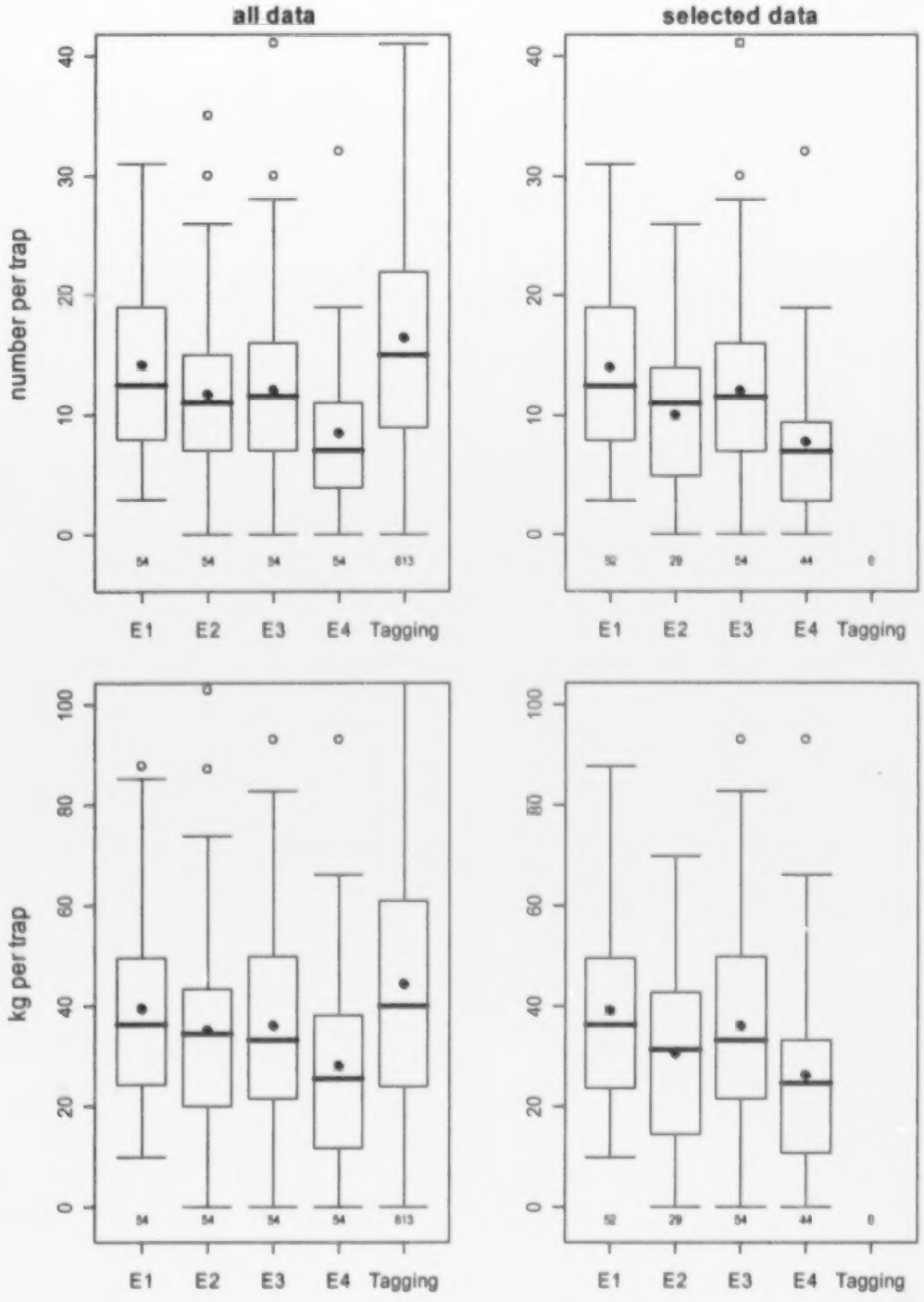

Figure 11. Distribution of sablefish trap catch rates by treatment for all traps (left) and selected traps (right). The upper histograms show catch rates by the number of fish per trap while the bottom histograms show weight (kg) per trap.

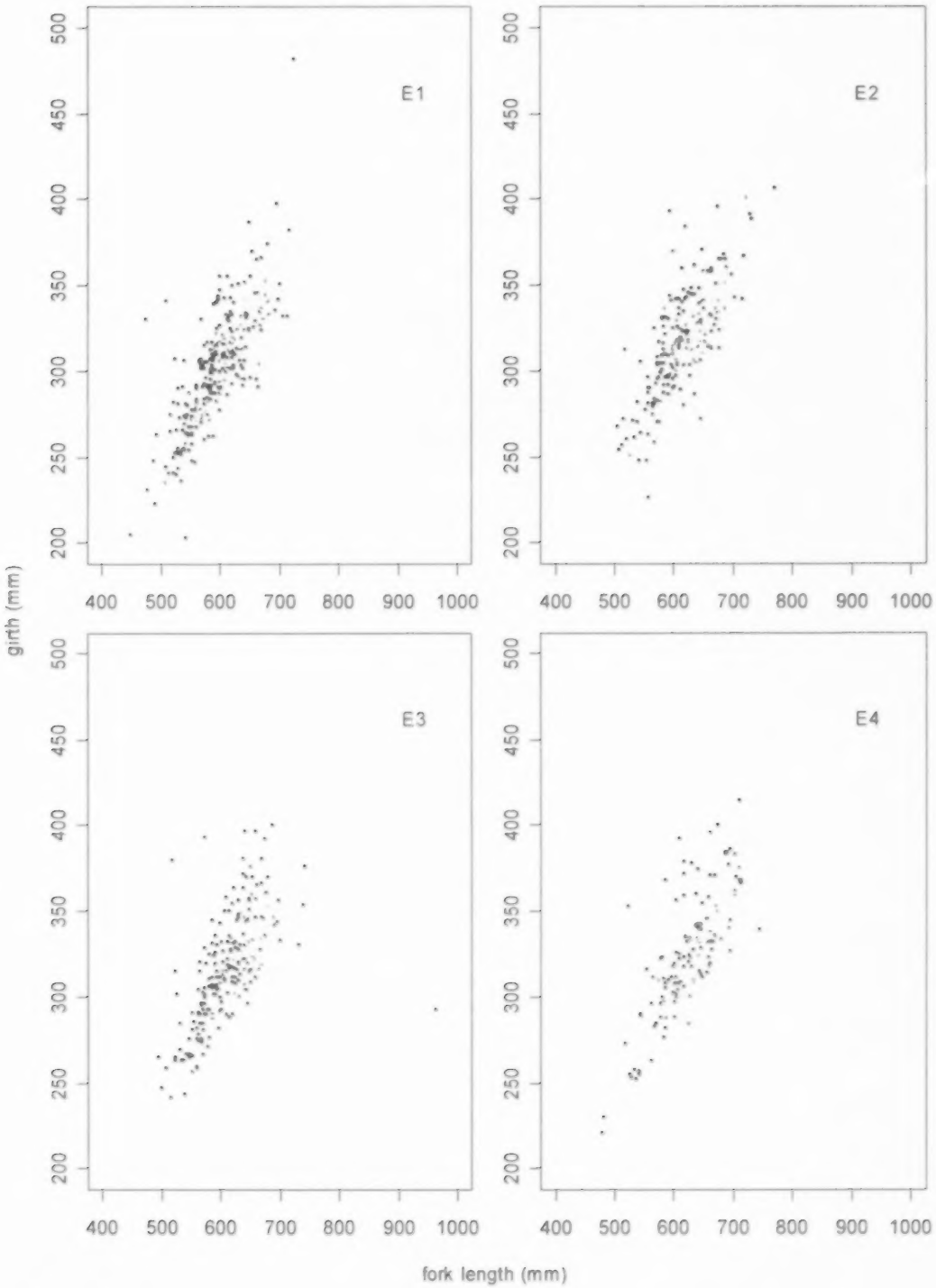

Figure 13. Sablefish length (mm) plotted against girth (mm) by sex and escape ring treatment level. Blue circles represent male sablefish while pink circles represent female sablefish.

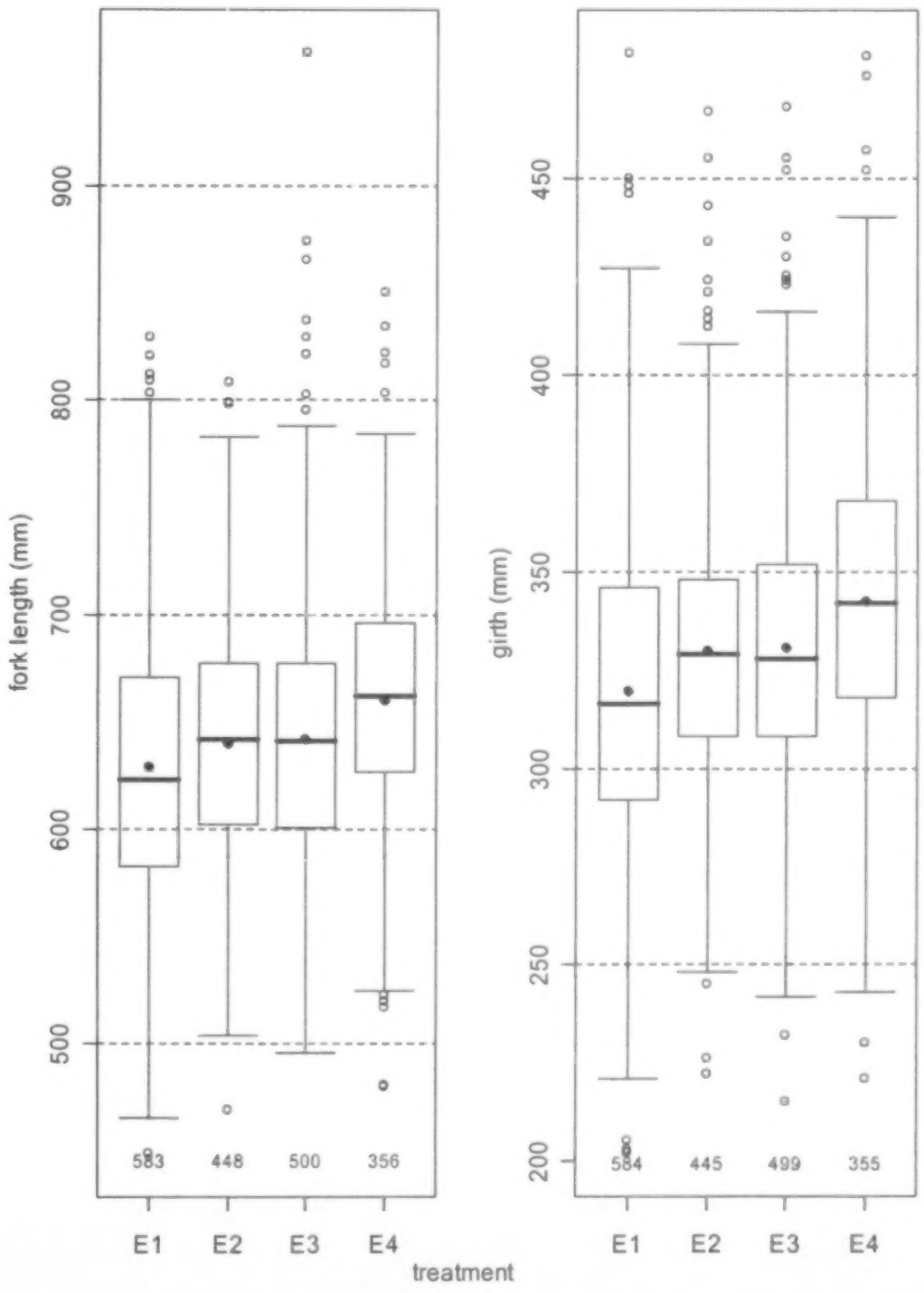

Figure 14. Distribution of sablefish fork lengths (mm) and girths (mm) by escape ring treatment over all sets. The sample size is listed below each boxplot.

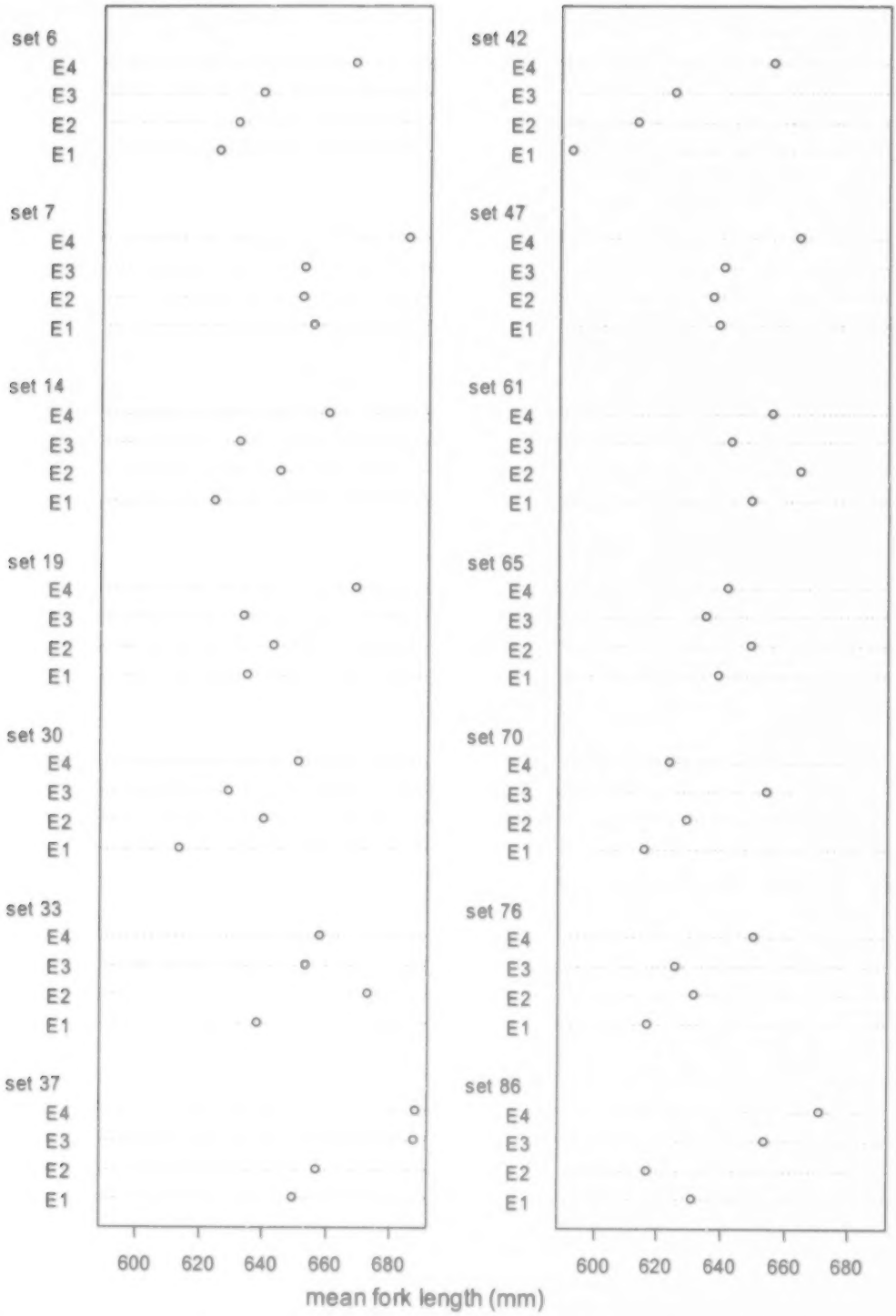

Figure 15. Average sablefish fork length (mm) for the escape ring experiment by set and treatment level.

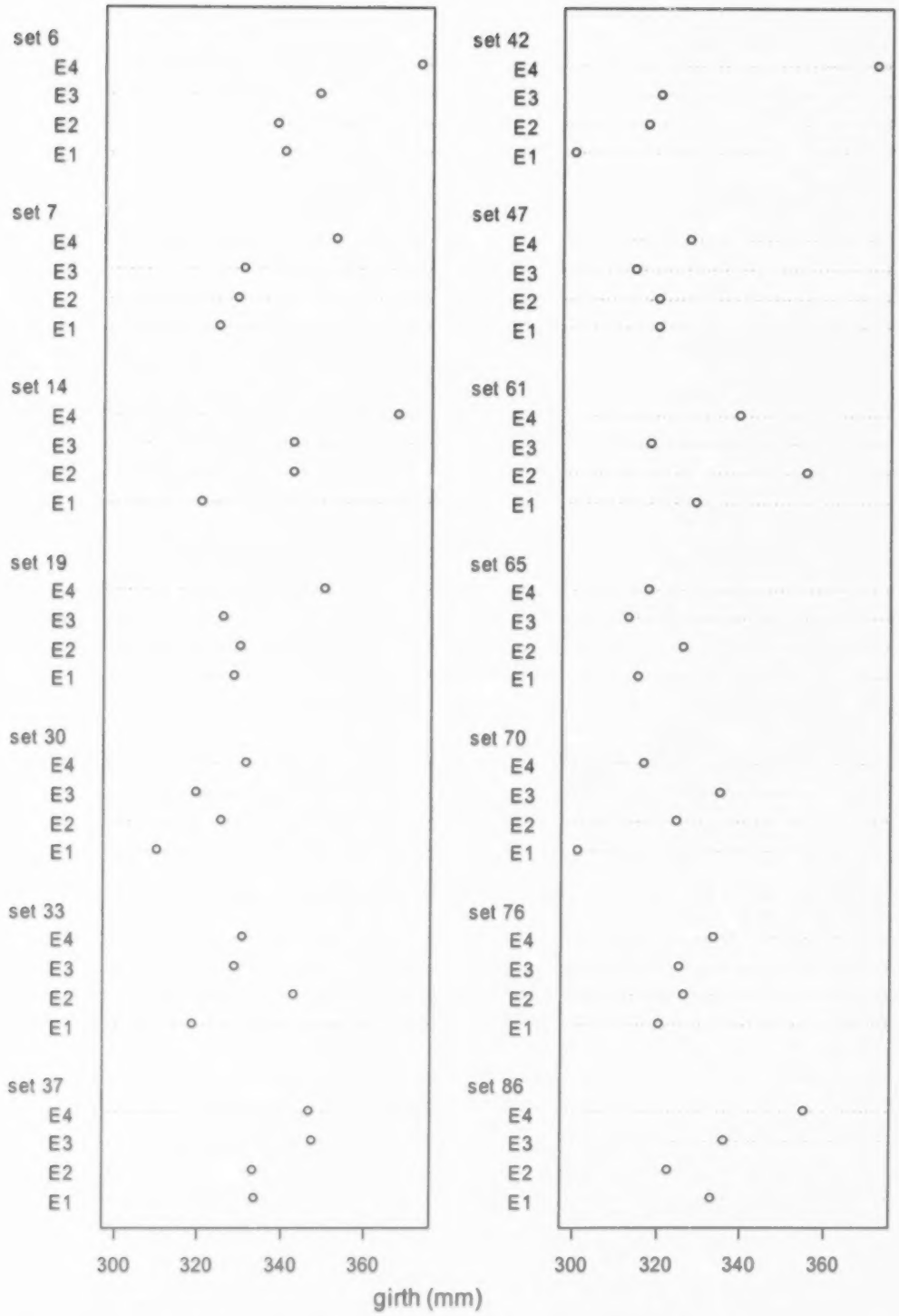

Figure 16. Average sablefish girth (mm) for the escape ring experiment by set and treatment level.

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APPENDIX A DETAILS OF SETS COMPLETED DURING THE 2005 STANDARDIZED CHARTER (F/V PACIFIC VIKING)

Sets are listed sequentially by the start date. The locality name, target depth interval, the start date and time as well as the duration in minutes are shown for each set. Position data include the Groundfish Major, Minor, and Locality area coding as well as the start and end latitude and longitude in degrees and decimal minutes. The bottom depth (m) at the start and end of the set are shown. The mean bottom depth is calculated from recordings at one minute intervals between the start and end of the set. The number of traps fished is also shown and excludes only open traps, while holed or fouled traps are included. All sets were baited with approximately one kilogram of frozen squid in a bait bag in each trap.

		Target			Duration		Start		End		Bottom depth (m)			Traps
Locality	Set	interval	Date	Time	(min)	Area code	Latitude	Longitude	Latitude	Longitude	Start	End	Mean	fished
Barkley Canyon	1	D0	05-Oct	0921	1248	03-23-10	48 20.6	125 52.0	48 20.3	125 51.3	201	170	185	25
	2	D1	05-Oct	1016	1274	03-23-10	48 20.0	125 54.2	48 20.1	125 53.1	417	415	413	25
	3	D2	05-Oct	1057	1304	03-23-10	48 19.7	125 54.6	48 19.6	125 55.6	481	558	503	25
	4	D3	05-Oct	1202	1327	03-23-10	48 19.8	125 56.9	48 20.2	125 57.3	649	724	695	25
	5	D4	05-Oct	1259	1371	03-23-10	48 20.0	126 03.0	48 19.4	126 03.0	841	914	892	25
	6	D5	05-Oct	1339	1401	03-23-10	48 17.5	126 02.6	48 16.8	126 02.8	1070	1084	1066	25
	7	D6	05-Oct	1419	1450	03-23-10	48 16.7	126 05.7	48 16.2	126 06.0	1189	1280	1245	25
	8	D7	05-Oct	1505	1479	03-23-10	48 15.8	126 07.1	48 15.1	126 08.1	1372	1408	1392	25
Esperanza Inlet	9	D6	07-Oct	0618	1427	04-25-4	49 31.3	127 30.3	49 30.6	127 30.6	1200	1280	1225	25
	10	D5	07-Oct	0658	1456	04-25-4	49 31.4	127 32.4	49 30.7	127 32.8	1024	1097	1083	25
	11	D4	07-Oct	0811	1473	04-26-8	49 32.9	127 37.5	49 33.3	127 36.7	843	828	838	25
	12	D3	07-Oct	0855	1492	04-26-8	49 34.8	127 36.4	49 34.5	127 35.5	640	759	677	25
	13	D2	07-Oct	1020	1503	04-26-8	49 42.5	127 33.0	49 41.8	127 33.4	532	488	505	25
	14	D1	07-Oct	1102	1517	04-26-8	49 43.7	127 35.0	49 42.2	127 34.6	435	452	415	25
	15	D0	07-Oct	1143	1535	04-26-8	49 43.9	127 33.6	49 43.1	127 33.1	265	274	254	25
Quatsino Sound	16	D0	09-Oct	0452	1439	04-27-3	50 22.8	128 19.0	50 22.3	128 18.7	198	252	229	25
	17	D1	09-Oct	0522	1456	04-27-3	50 22.1	128 19.1	50 21.6	128 19.3	327	435	382	24
	18	D2	09-Oct	0552	1488	04-27-3	50 21.1	128 19.7	50 20.6	128 20.4	486	430	508	25
	19	D3	09-Oct	0630	1532	04-27-3	50 20.5	128 22.7	50 20.1	128 23.0	717	658	669	25
	20	D4	09-Oct	0714	1585	04-27-6	50 19.5	128 27.2	50 18.9	128 27.5	823	860	861	25
	21	D5	09-Oct	0748	1629	04-27-6	50 18.4	128 28.8	50 17.9	128 29.2	1024	1084	1041	25
	22	D6	09-Oct	0823	1668	04-27-6	50 17.3	128 29.5	50 17.1	128 28.7	1207	1189	1216	23
Triangle Island	23	D6	12-Oct	1143	1312	05-11-0	50 58.4	129 44.1	50 59.1	129 44.0	1216	1234	1236	25

Locality	Set	Target interval	Date	Time	Duration (min)	Area code	Start Latitude	Start Longitude	End Latitude	End Longitude	Bottom depth (m) Start	Bottom depth (m) End	Bottom depth (m) Mean	Traps fished
	24	D5	12-Oct	1220	1352	05-11-7	51 00.9	129 41.1	51 00.6	129 42.1	1039	1024	1024	25
	25	D4	12-Oct	1329	1380	05-11-0	51 03.3	129 48.5	51 02.8	129 49.0	830	823	832	25
	26	D3	12-Oct	1403	1402	05-11-0	51 02.3	129 47.8	51 02.0	129 48.6	642	678	658	25
	27	D2	12-Oct	1533	1442	05-11-7	51 00.9	129 34.9	51 00.8	129 36.0	490	567	518	25
	28	D1	12-Oct	1632	1449	05-11-7	51 05.0	129 34.6	51 04.3	129 35.2	443	428	435	25
	29	D0	12-Oct	1716	1464	05-11-7	51 05.7	129 35.0	51 06.3	129 34.2	271	267	267	25
Cape St. James	30	D0	14-Oct	0428	1526	06-08-14	51 39.3	130 22.7	51 39.6	130 21.8	267	267	267	25
	31	D1	14-Oct	0459	1550	06-08-14	51 39.1	130 20.4	51 38.5	130 20.9	380	426	428	25
	32	D2	14-Oct	0533	1588	06-08-14	51 38.4	130 20.0	51 37.7	130 19.8	483	576	507	25
	33	D3	14-Oct	0715	1619	06-08-6	51 45.4	130 31.1	51 44.8	130 31.2	660	691	669	25
	34	D4	14-Oct	0742	1654	06-08-6	51 44.1	130 31.6	51 43.6	130 31.1	841	828	825	25
	35	D5	14-Oct	0812	1704	06-08-14	51 41.7	130 32.9	51 41.1	130 33.7	1017	1037	1035	25
	36	D6	14-Oct	0849	1758	06-08-15	51 38.7	130 35.7	51 38.0	130 36.0	1214	1220	1211	25
Gowgaia Bay	37	D6	16-Oct	0631	1720	09-34-3	52 23.0	131 44.7	52 22.9	131 45.7	1189	1357	1293	25
	38	D5	16-Oct	0738	1734	09-34-3	52 20.5	131 41.8	52 20.1	131 42.6	1006	1061	1017	25
	39	D4	16-Oct	0846	1752	09-34-3	52 17.9	131 36.4	52 17.8	131 37.4	828	849	838	25
	40	D3	16-Oct	0936	1765	09-34-5	52 17.1	131 34.2	52 17.2	131 35.2	651	647	691	25
	41	D2	16-Oct	1007	1793	09-34-3	52 17.9	131 35.2	52 18.5	131 36.1	483	541	538	25
	42	D1	16-Oct	1050	1831	09-34-3	52 20.9	131 38.8	52 21.6	131 39.4	399	439	411	25
	43	D0	16-Oct	1128	1853	09-34-3	52 21.6	131 38.0	52 22.3	131 38.3	219	240	234	24
Buck Point	44	D0	18-Oct	0557	1448	09-31-3	53 06.4	132 39.0	53 05.9	132 39.9	262	271	251	25
	45	D1	18-Oct	0622	1476	09-31-3	53 05.5	132 40.8	53 04.7	132 40.4	443	450	443	25
	46	D2	18-Oct	0659	1532	09-31-8	53 03.2	132 38.3	53 03.4	132 39.3	468	541	499	25
	47	D3	18-Oct	0813	1539	09-31-8	53 01.2	132 36.3	53 01.5	132 37.1	640	671	668	25
	48	D4	18-Oct	0841	1586	09-31-8	53 01.7	132 33.3	53 02.2	132 39.0	838	834	852	25
	49	D5	18-Oct	0911	1636	09-31-8	53 02.8	132 40.8	53 03.2	132 41.8	1006	1041	1033	25
	50	D6	18-Oct	0948	1666	09-31-8	53 02.0	132 40.9	53 01.4	132 39.9	1214	1223	1216	25
Hippa Island	51	D6	20-Oct	0405	2183	09-31-0	53 23.0	133 18.5	53 22.4	133 18.7	1209	1203	1211	25
	52	D5	20-Oct	0457	2051	09-31-14	53 22.0	133 15.4	53 22.0	133 14.4	1037	1057	1050	25
	53	D4	20-Oct	0611	1863	09-31-1	53 24.4	133 03.8	53 25.7	133 04.2	832	828	861	25
	54	D3	20-Oct	0715	1715	09-31-1	53 22.4	133 00.2	53 22.7	133 01.1	662	675	658	25
	55	D1	20-Oct	0757	1605	09-31-1	53 25.2	133 01.4	53 24.6	133 01.5	523	550	554	25

Locality	Set	Target interval	Date	Time	Duration (min)	Area code	Start Latitude	Start Longitude	End Latitude	End Longitude	Bottom depth (m) Start	Bottom depth (m) End	Bottom depth (m) Mean	Traps fished
	56	D2	20-Oct	0847	1490	09-31-1	53 22.9	132 59.2	53 22.3	132 58.6	443	435	443	25
	57	D0	20-Oct	0924	1381	09-31-1	53 21.7	132 56.5	53 21.2	132 55.6	263	267	258	23
Langara Island-North Frederick	58	D6	22-Oct	1441	1287	09-35-0	54 03.9	133 51.9	54 04.5	133 51.9	1227	1170	1192	24
	59	D5	22-Oct	1527	1311	09-35-0	54 04.8	133 48.6	54 04.7	133 49.6	1019	1070	1042	25
	60	D4	22-Oct	1633	1335	09-35-6	54 01.9	133 42.6	54 02.6	133 43.0	838	854	854	25
	61	D3	22-Oct	1718	1339	09-35-2	54 01.5	133 40.3	54 02.1	133 40.9	666	655	655	25
	62	D2	22-Oct	1748	1378	09-35-6	54 03.5	133 41.0	54 03.6	133 42.2	457	594	527	25
	63	D1	22-Oct	1818	1400	09-35-6	54 04.4	133 41.3	54 05.1	133 41.6	428	441	437	25
	64	D0	22-Oct	1848	1428	09-35-6	54 06.0	133 40.4	54 06.8	133 40.9	272	249	251	25
Portland Inlet	65		25-Oct	0628	1202	08-04-12	54 51.0	130 12.0	54 51.8	130 11.7	439	437	437	25
	66		25-Oct	0727	1234	08-04-12	54 48.1	130 15.7	54 47.4	130 16.2	496	492	494	25
	67		25-Oct	0813	1261	08-04-12	54 46.0	130 21.6	54 45.4	130 22.3	512	541	527	25
	68		25-Oct	0904	1303	08-04-12	54 42.4	130 25.9	54 41.9	130 26.5	550	593	583	25
	69		25-Oct	1003	1348	08-04-10	54 39.3	130 32.0	54 38.8	130 32.1	638	638	638	25
Gil Island	70		27-Oct	0805	1097	07-06-6	53 19.3	129 18.4	53 18.7	129 18.2	536	539	538	25
	71		27-Oct	0919	1137	07-06-6	53 12.3	129 22.8	53 11.8	129 23.6	565	525	538	25
	72		27-Oct	1012	1185	07-06-6	53 07.0	129 21.8	53 06.4	129 21.3	653	651	664	25
	73		27-Oct	1207	1208	07-06-6	53 07.2	129 07.2	53 06.4	129 07.4	547	569	561	25
	74		27-Oct	1317	1215	07-06-6	53 11.5	129 08.0	53 10.6	129 07.9	565	569	569	25
Finlayson Channel	75		29-Oct	0608	1189	07-07-3	52 47.4	128 25.8	52 46.8	128 26.3	569	604	582	24
	76		29-Oct	0654	1219	07-07-3	52 43.9	128 27.9	52 43.2	128 27.7	605	567	591	23
	77		29-Oct	0745	1259	07-07-3	52 39.8	128 28.3	52 39.1	128 28.5	602	589	622	25
	78		29-Oct	0852	1276	07-07-3	52 34.1	128 27.9	52 34.7	128 28.0	653	695	664	25
	79		29-Oct	1000	1290	07-07-3	52 30.4	128 27.6	52 31.2	128 27.8	832	755	807	25
Dean/Burke Channel	80		30-Oct	1519	1076	06-08-8	52 20.5	127 28.6	52 21.0	127 28.1	519	514	516	25
	81		30-Oct	1652	1091	06-08-8	52 26.8	127 16.1	52 26.4	127 15.3	516	519	530	25
	82		30-Oct	1816	1146	06-08-8	52 16.7	127 14.9	52 16.1	127 15.7	572	572	578	25
	83		30-Oct	1910	1193	06-08-8	52 14.0	127 24.7	52 13.6	127 25.7	593	589	591	25
	84		30-Oct	2016	1261	06-08-8	52 07.8	127 36.2	52 07.5	127 37.5	444	415	450	25

APPENDIX B DETAILS OF SETS COMPLETED DURING THE 2005 TAGGING CHARTER (F/V VIKING SUNRISE)

Sets are listed sequentially by the start date. The locality name, the type of set (Type 1 traditional or Type 3 random), target depth and area stratum, the start date and time as well as the duration in minutes are shown for each set. Position data include the Groundfish Major, Minor, and Locality area coding as well as the start and end latitude and longitude in degrees and decimal minutes. The bottom depth (m) at the start and end of the set are shown. The mean bottom depth is calculated from recordings at one minute intervals between the start and end of the set. The number of traps fished is also shown and excludes only open traps, while holed or fouled traps are included. All sets were baited with approximately one kilogram of frozen squid in a bait bag and 3-4 kg of frozen Pacific hake loose in each trap.

		Set	Stratum				Duration		Start		End		Bottom depth (m)			Traps
Set	Locality	type	Spatial	Depth	Date	Time	(min)	Area code	Latitude	Longitude	Latitude	Longitude	Start	End	Mean	fished
1	-	3	S_1	RD_2	08-Oct	1626	1321	03-23-10	48 22.8	125 56.2	48 22.6	125 57.6	614	591	602	25
2	-	3	S_1	RD_2	08-Oct	1800	1373	03-23-10	48 19.6	126 06.4	48 19.3	126 07.3	668	755	726	24
3	-	3	S_1	RD_2	08-Oct	2045	1400	03-23-13	48 13.1	125 55.0	48 12.6	125 55.9	609	678	658	25
4	-	3	S_1	RD_3	09-Oct	0607	1593	03-23-13	48 13.2	126 01.6	48 12.9	126 02.4	783	849	805	25
5	-	3	S_1	RD_3	09-Oct	0730	1620	03-23-13	48 10.0	126 01.6	48 09.8	126 02.5	1128	1134	1134	25
6	Barkley Canyon	1			09-Oct	0914	1650	03-23-13	48 15.6	125 55.5	48 15.1	125 57.8	569	574	578	61
7	Father Charles Canyon	1			12-Oct	1546	1240	03-23-12	48 36.1	126 13.7	48 35.9	126 16.0	457	786	572	65
8	-	3	S_1	RD_2	12-Oct	1733	1441	03-23-10	48 27.4	126 10.6	48 27.0	126 11.4	459	534	503	24
9	-	3	S_1	RD_3	12-Oct	2129	1367	03-23-	48 29.9	126 23.3	48 29.5	126 24.1	1143	1172	1156	25
10	-	3	S_1	RD_3	13-Oct	0621	1329	03-23-12	48 37.6	126 24.4	48 37.2	126 25.2	969	1052	1020	27
11	-	3	S_1	RD_2	13-Oct	0849	1372	03-24-7	48 48.1	126 36.1	48 47.8	126 37.0	457	507	490	25
12	-	3	S_1	RD_1	15-Oct	1521	1553	04-25-1	49 06.1	126 51.0	49 05.7	126 51.8	203	218	212	25
13	-	3	S_1	RD_3	15-Oct	1634	1351	04-25-	49 02.8	126 59.7	49 02.3	127 00.6	823		900	25
14	Estevan Point	1			15-Oct	1752	1016	04-25-1	49 03.9	126 57.0	49 03.1	126 58.4	485	682	578	65
15	-	3	S_1	RD_1	15-Oct	1929	1397	04-25-1	49 05.0	126 52.6	49 04.5	126 51.9	267	258	262	25
16	-	3	S_1	RD_1	15-Oct	2022	1463	04-25-1	49 02.8	126 51.7	49 02.3	126 52.4	331	391	362	25
17	-	3	S_1	RD_1	16-Oct	0622	1431	04-25-1	49 09.8	126 58.7	49 10.4	126 58.3	316	263	285	26
18	-	3	S_1	RD_1	16-Oct	0754	1485	04-25-2	49 17.5	127 05.5	49 17.4	127 06.8	188	203	196	25
19	Esperanza Inlet	1			17-Oct	1125	1311	04-25-4	49 26.1	127 15.5	49 24.7	127 16.6	455	519	578	65
20	-	3	S_1	RD_3	17-Oct	1342	1398	04-25-	49 25.0	127 29.2	49 23.3	127 30.5	1211	1231	1207	25
21	-	3	S_2	RD_3	17-Oct	1522	1451	04-25-4	49 28.4	127 24.8	49 28.1	127 25.8	1240	1293	1240	25

Set	Locality	Set type	Stratum		Date	Time	Duration (min)	Area code	Start		End		Bottom depth (m)			Traps fished
			Spatial	Depth					Latitude	Longitude	Latitude	Longitude	Start	End	Mean	
54	-	3	S_3	RD_1	03-Nov	2341	1475	06-08-6	51 58.7	130 38.9	51 58.6	130 40.1	256	344	304	25
55	-	3	S_4	RD_1	05-Nov	0745	1370	09-34-1	52 07.7	131 21.3	52 07.4	131 22.3	170	315	216	25
56	-	3	S_4	RD_2	05-Nov	0856	1402	09-34-1	52 04.3	131 21.7	52 04.2	131 22.8	483	660	556	22
57	-	3	S_4	RD_2	05-Nov	0931	1447	09-34-1	52 03.4	131 21.7	52 03.1	131 22.6	571	790	704	24
58	-	3	S_4	RD_3	05-Nov	1027	1501	09-34-1	52 01.9	131 22.3	52 01.7	131 23.2	1134	1417	1244	23
59	-	3	S_4	RD_2	05-Nov	1212	1548	09-34-1	52 07.4	131 33.6	52 07.7	131 34.6	461	605	532	25
60	-	3	S_4	RD_2	05-Nov	1344	1816	09-34-5	52 11.5	131 28.6	52 11.5	131 29.9	755	792	794	25
61	Gowgaia Bay	1			05-Nov	1500	1540	09-34-5	52 17.2	131 33.6	52 17.6	131 35.7	465	726	578	45
62	-	3	S_4	RD_1	05-Nov	1637	1745	09-34-5	52 13.6	131 28.7	52 14.1	131 29.8	366	468	465	24
63	-	3	S_4	RD_1	07-Nov	0606	1484	09-34-3	52 27.6	131 43.5	52 27.5	131 44.6	181	291	201	25
64	-	3	S_4	RD_3	07-Nov	0819	1527	09-34-2	52 33.5	131 58.1	52 33.4	131 58.9	905	1189	1063	25
65	Tasu Sound	1			07-Nov	0944	1571	09-34-4	52 35.9	131 59.9	52 36.8	132 02.3	512	748	624	63
66	-	3	S_4	RD_1	07-Nov	1108	1722	09-34-4	52 35.2	131 56.7	52 34.9	131 57.7	201	316	236	23
67	-	3	S_4	RD_2	07-Nov	1255	1850	09-31-13	52 41.4	132 08.0	52 40.8	132 07.4	710	794	750	25
68	-	3	S_4	RD_3	08-Nov	2343	4995	09-31-	52 53.1	132 38.1	52 52.8	132 40.0		1214	1222	25
69	-	3	S_4	RD_3	09-Nov	0042	4820	09-31-	52 53.9	132 46.0	52 54.3	132 47.2	1046	1042	1041	25
70	Buck Point	1			09-Nov	0829	4617	09-31-8	53 02.0	132 36.7	53 02.1	132 38.5	477	785	657	40
71	-	3	S_4	RD_1	09-Nov	0955	4655	09-31-8	53 01.3	132 31.1	53 00.8	132 32.0	196	210	201	25
72	-	3	S_4	RD_3	09-Nov	1240	5299	09-31-	53 02.4	132 53.7	53 02.3	132 52.6	1055	1070	1083	24
73	-	3	S_5	RD_3	09-Nov	1346	5154	09-31-	53 03.2	132 55.6	53 03.8	132 56.7	1138	1198	1178	25
74	-	3	S_5	RD_2	09-Nov	1552	5329	09-31-14	53 15.6	133 09.4	53 15.5	133 10.6	732	746	741	25
75	-	3	S_5	RD_2	09-Nov	1639	5362	09-31-14	53 16.6	133 09.2	53 16.8	133 08.2	653	697	666	25
76	Hippa Island	1			13-Nov	1257	1033	09-31-12	53 29.4	133 07.2	53 30.6	133 08.6	475	481	563	64
77	-	3	S_5	RD_2	13-Nov	1421	1097	09-31-6	53 35.3	133 11.5	53 35.3	133 12.7	611	728	666	25
78	-	3	S_5	RD_3	13-Nov	1639	1119	09-31-11	53 44.1	133 28.5	53 44.0	133 29.6	1097	1117	1106	25
79	-	3	S_5	RD_2	13-Nov	1748	1147	09-31-4	53 44.4	133 21.1	53 44.2	133 19.9	483	424	444	25
80	-	3	S_5	RD_1	13-Nov	1930	1167	09-31-2	53 52.7	133 29.3	53 53.1	133 30.3	338	346	342	25
81	-	3	S_5	RD_1	14-Nov	1847	1303	09-35-5	54 13.2	133 29.8	54 13.9	133 30.3	390	380	384	25
82	-	3	S_5	RD_1	14-Nov	1959	1362	09-35-6	54 16.2	133 41.5	54 17.0	133 42.4	262	256	258	23
83	-	3	S_5	RD_1	15-Nov	0633	1403	09-35-6	54 11.7	133 42.8	54 11.9	133 44.0	243	234	238	25
84	-	3	S_5	RD_3	15-Nov	0736	1706	09-35-6	54 10.7	133 51.6	54 11.4	133 52.3	951	922	929	27
85	-	3	S_5	RD_3	15-Nov	0848	1473	09-35-6	54 15.5	133 56.6	54 16.1	133 57.6	830	964	903	25

Set	Locality	Set type	Stratum		Date	Time	Duration (min)	Area code	Start		End		Bottom depth (m)			Traps fished
			Spatial	Depth					Latitude	Longitude	Latitude	Longitude	Start	End	Mean	
22	-	3	S_2	RD_2	17-Oct	1659	1460	04-26-8	49 34.0	127 32.0	49 33.5	127 32.3	640	680	657	25
23	-	3	S_2	RD_3	17-Oct	1800	1507	04-26-	49 31.8	127 39.8	49 31.4	127 40.9	920	949	938	25
24	-	3	S_2	RD_2	18-Oct	2212	1220	04-26-8	49 40.1	127 29.8	49 39.6	127 30.7	582	635	607	24
25	-	3	S_2	RD_2	18-Oct	2344	1352	04-26-4	49 43.7	127 41.7	49 43.1	127 42.3	812	777	785	24
26	-	3	S_2	RD_2	19-Oct	0039	1450	04-26-4	49 45.2	127 39.7	49 44.8	127 40.7	589	697	655	25
27	-	3	S_2	RD_1	19-Oct	0222	1754	04-26-4	49 53.8	127 44.1	49 53.7	127 45.1	240	245	302	25
28	-	3	S_2	RD_3	20-Oct	1345	2901	04-27-	50 15.4	128 37.4	50 14.9	128 38.0	1046	960	993	25
29	-	3	S_2	RD_1	20-Oct	1636	3075	04-27-3	50 21.2	128 22.1	50 21.1	128 23.2	452	386	426	25
30	Quatsino Sound	1			20-Oct	1746	2817	04-27-3	50 20.3	128 23.5	50 19.5	128 25.6	490	673	530	65
31	-	3	S_2	RD_1	22-Oct	0655	1409	04-27-3	50 24.4	128 18.7	50 24.1	128 19.7	187	192	188	25
32	-	3	S_2	RD_1	22-Oct	0910	1452	05-11-11	50 33.4	128 37.4	50 32.9	128 38.2	247	393	384	15
33	Pisces Canyon	1			22-Oct	1022	1536	05-11-11	50 30.7	128 35.1	50 29.4	128 35.2	344	625	558	65
34	-	3	S_2	RD_3	26-Oct	0719	4359	05-11-10	50 41.1	129 04.6	50 40.6	129 05.2	942	1006	898	25
35	-	3	S_2	RD_1	26-Oct	0847	4540	05-11-10	50 43.7	129 13.4	50 43.6	129 14.5		353	256	24
36	-	3	S_2	RD_2	26-Oct	1003	4578	05-11-10	50 42.6	129 16.6	50 42.5	129 17.6	486	605	534	25
37	Triangle Island	1			26-Oct	1351	4592	05-11-7	51 02.2	129 32.8	51 01.0	129 34.8	510	474	490	65
38	-	3	S_3	RD_1	26-Oct	1519	4793	05-11-7	50 59.7	129 28.6	50 59.2	129 29.3	223	227	227	25
39	-	3	S_3	RD_2	26-Oct	1641	4562	05-11-7	51 03.9	129 31.8	51 03.4	129 32.5	490	545	505	25
40	-	3	S_3	RD_1	30-Oct	0456	1671	06-08-10	51 17.0	129 41.2	51 17.4	129 42.0	240	236	236	24
41	-	3	S_3	RD_2	30-Oct	0557	2085	06-08-10	51 15.6	129 47.3	51 15.0	129 47.6	572	580	583	25
42	Middle Ground	1			30-Oct	0746	2850	05-11-12	51 13.7	130 02.7	51 12.3	130 02.3	536	561	549	64
43	-	3	S_3	RD_3	30-Oct	1003	2989	05-11-	51 08.9	130 13.9	51 08.9	130 13.3	1275	1289	1275	25
44	-	3	S_3	RD_3	30-Oct	1203	3047	06-08-10	51 17.5	130 11.4	51 17.1	130 11.6	951	1041	1004	25
45	-	3	S_3	RD_2	01-Nov	1853	1457	06-08-15	51 34.7	130 24.3	51 34.7	130 25.3	728		671	25
46	-	3	S_3	RD_3	01-Nov	2004	1523	06-08-15	51 32.5	130 31.1	51 32.6	130 32.1	1167	1207	1189	25
47	Cape St. James	1			01-Nov	2219	979	06-08-12	51 41.9	130 47.0	51 42.7	130 49.6	669	794	768	65
48	-	3	S_3	RD_3	01-Nov	2337	1510	06-08-12	51 41.9	130 48.7	51 41.7	130 49.8	869	1011	942	25
49	-	3	S_3	RD_3	02-Nov	0133	2008	06-08-15	51 40.0	130 36.2	51 40.0	130 35.0	1134	1128	1097	25
50	-	3	S_3	RD_2	03-Nov	1519	1339	06-08-6	51 46.6	130 38.2	51 46.6	130 37.4	609	627	616	25
51	-	3	S_3	RD_2	03-Nov	1613	1375	06-08-6	51 45.2	130 34.8	51 44.9	130 34.8	678	594	638	25
52	-	3	S_3	RD_1	03-Nov	1900	1414	06-08-11	51 43.1	130 08.6	51 43.0	130 07.6	232	254	249	25
53	-	3	S_3	RD_1	03-Nov	2125	1439	06-08-6	51 50.4	130 21.0	51 50.3	130 21.7	219	225	223	25

Set	Locality	Set type	Stratum		Date	Time	Duration (min)	Area code	Start		End		Bottom depth (m)			Traps fished
			Spatial	Depth					Latitude	Longitude	Latitude	Longitude	Start	End	Mean	
86	Langara Island-North Frederick	1			15-Nov	1130	1742	09-35-6	54 06.8	133 42.6	54 06.7	133 44.0	477	618	538	36
87	-	3	S_5	RD_3	15-Nov	1223	1951	09-35-6	54 04.9	133 45.6	54 04.9	133 46.6	817	883	849	25
88	-	3	S_5	RD_2	15-Nov	1327	1467	09-35-6	54 09.0	133 47.8	54 09.1	133 48.9	527	640	558	25

APPENDIX C EXAMPLE DATA FORMS

SABLEFISH CHARTER SETTING BRIDGE LOG

VESSEL: VIKING SUNRISE SET NUMBER: 001

LOCALITY: South WCVI (1) REASON: Random Tagging (Type 3)

Depth Stratum: RD2 Recorder: MALCOLM

Target Depth: Minimum: 250 (fm) Maximum: 450 (fm)

SET: Date: year 2005 month 10 day 5

1st Buoy: Number: 11 Time: 1614 Bottom Depth: 168 (fm)

Latitude: deg. 48 min. 22.872 Longitude: deg. 125 min. 55.241

1st Anchor : Time: 1626 Bottom Depth: 336 (fm)

Latitude: deg. 48 min. 22.798 Longitude: deg. 125 min. 56.207

SETTING BOTTOM DEPTH (fm/min): 335, 334, 334, 331, 330, 330, —, — 325, 325, 324, 326, 320

Mean: (of fm/min)

2nd Anchor: Time: 1640 Bottom Depth: 323 (fm)

Latitude: deg. 48 min. 22.605 Longitude: deg. 125 min. 56.404

2nd Buoy: Number: 05 Time: 1652 Bottom Depth: 283 (fm)

Latitude: deg. 48 min. 22.382 Longitude: deg. 125 min. 57.641

COMMENTS: Fathom 8350

Bottom depths readings are low in this area

Figure C.1. Example of a completed bridge log data form used on the 2005 survey. This form was completed from the bridge as each string was set.

SABLEFISH CHARTER SET LOG

VESSEL: Viking Sunrise SET NUMBER: 001

DATE: Oct. 08/05 Recorder: C. Homan

1st Buoy Number: 11 Time: 1613

1st ANCHOR TIME 1623

NUMBER TRAPS SET: ~~HH~~ ~~HH~~ ~~HH~~ ~~HH~~ ~~HH~~ (25)

TEMP SENSOR: # ~~1252~~ 1252 On Trap #: 3

Missed Beckets: 0

2nd ANCHOR TIME 1641

2nd Buoy Number 5 Time: 1652

BAIT: Type 1: Hake Weight: 10 1/2 (lb) Method: Loose

Type 2: Squid Weight: 2 lbs (lb) Method: Bg

COMMENTS:

BAIT WEIGHT QUALITY CONTROL Date Sampled: Oct. 8/05

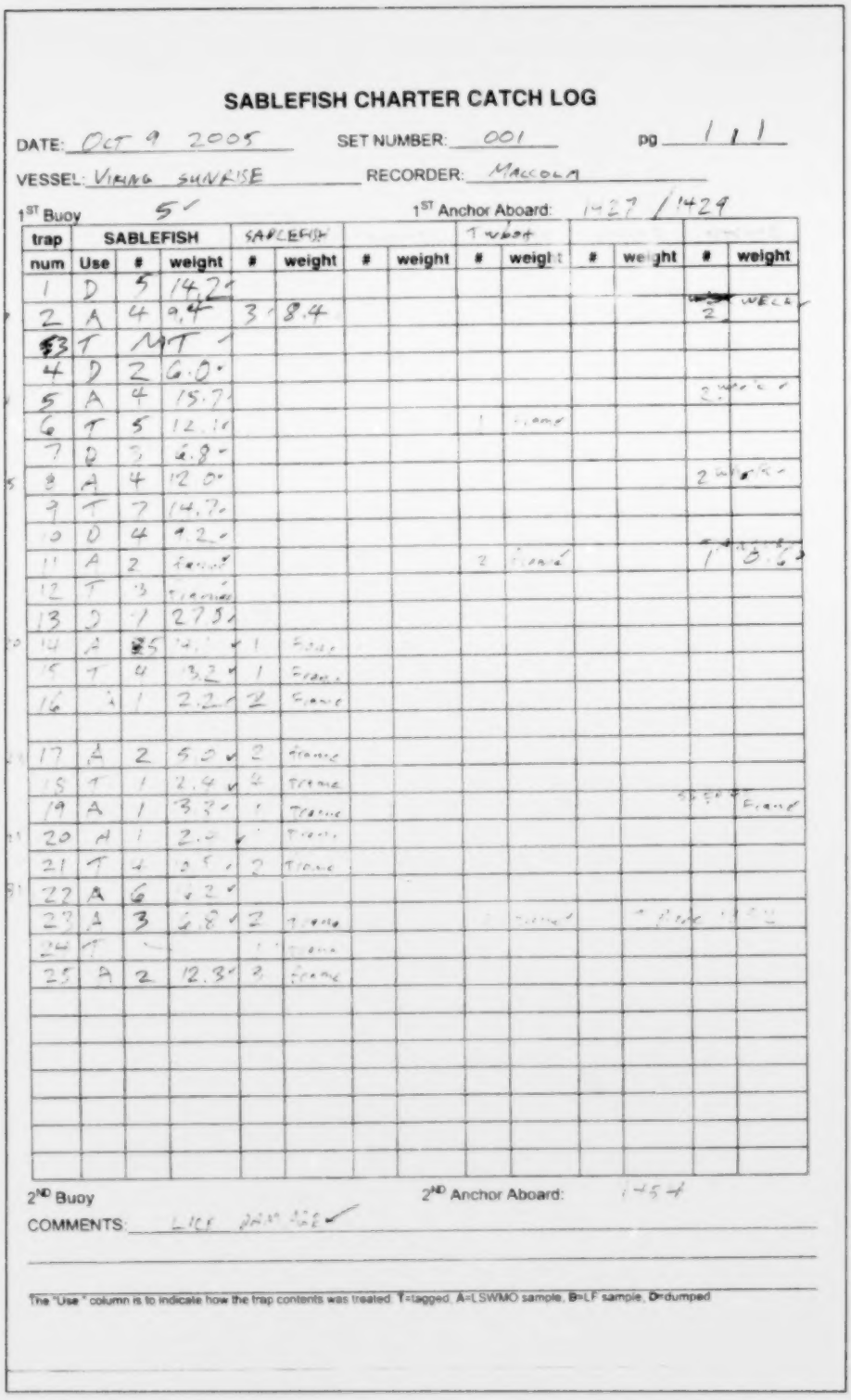
Bait Type: Squid Sampler:

SOURCE: Vessel: Viking Sunrise Set(s): 001

(Kg) with Bag

Gross Weight/Bag 1:	1.1	2:	1.2	3:	1.2	4:	1.2		
5:	1.1	6:	1.1	7:	1.1	8:	1.0	9:	1.4
10:	1.2	11:	1.1	12:	1.2	13:	1.5	14:	1.1
15:	1.0	16:	Bad	Weather		18:		19:	
20:		21:		22:		23:		24:	
25:		26:		27:		28:		29:	

Figure C.2. Example of a completed set log data form used on the 2005 survey. This form was completed from the deck as the gear was set.



SABLEFISH CHARTER CATCH LOG

DATE: Oct 9 2005 SET NUMBER: 001 pg 1 / 1

VESSEL: VIKING SUNRISE RECORDER: MALCOLM

1ST Buoy 5 ✓ 1ST Anchor Aboard: 1427 / 1429

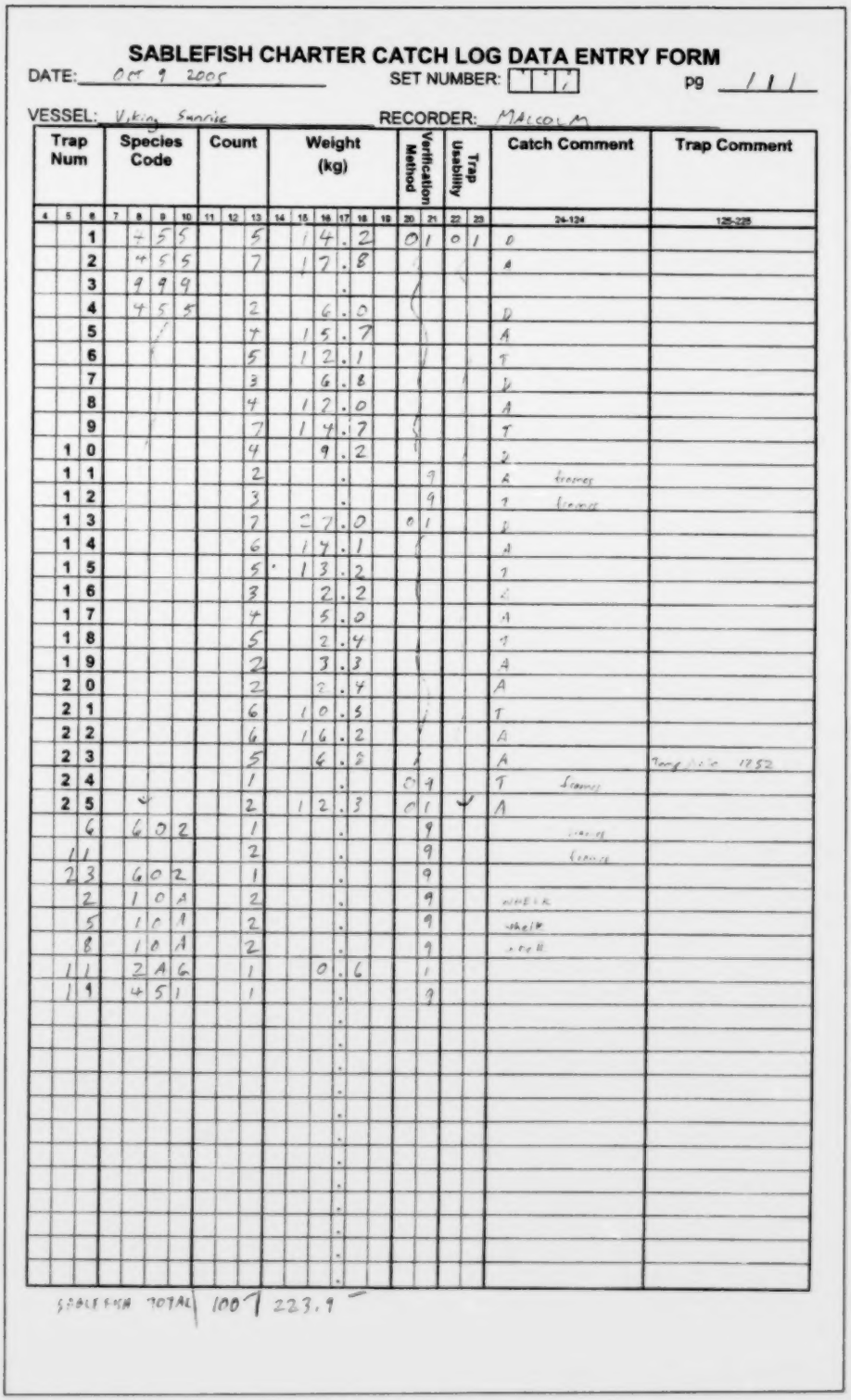
trap	SABLEFISH			SABLEFISH									
num	Use	#	weight	#	weight	#	weight	#	weight	#	weight	#	weight
1	D	5	14.2										
2	A	4	9.4	3	8.4							2	WELL
3	T	MT	1										
4	D	2	6.0										
5	A	4	15.7									2	
6	T	5	12.1			1	Frame						
7	D	3	6.8										
8	A	4	12.0									2	
9	T	7	14.7										
10	D	4	9.2										
11	A	2	Frame			2	Frame					1	
12	T	3	Frame										
13	D	1	2.7										
14	A	5	14.1 ✓	1	Frame								
15	T	4	3.2 ✓	1	Frame								
16	A	1	2.2	2	Frame								
17	A	2	5.0 ✓	2	Frame								
18	T	1	2.4 ✓	2	Frame								
19	A	1	3.3	1	Frame								Frame
20	A	1	2.0 ✓	1	Frame								
21	T	4	8.5	2	Frame								
22	A	6	4.2 ✓										
23	A	3	6.8 ✓	2	Frame								
24	T			1	Frame								
25	A	2	12.3	3	Frame								

2ND Buoy 2ND Anchor Aboard: 1454

COMMENTS: LIVE WELL ✓

The "Use" column is to indicate how the trap contents was treated. T=tagged, A=LSWMO sample, B=LF sample, D=dumped

Figure C.3. Example of a completed catch log data form used during the 2005 survey.



SABLEFISH CHARTER CATCH LOG DATA ENTRY FORM

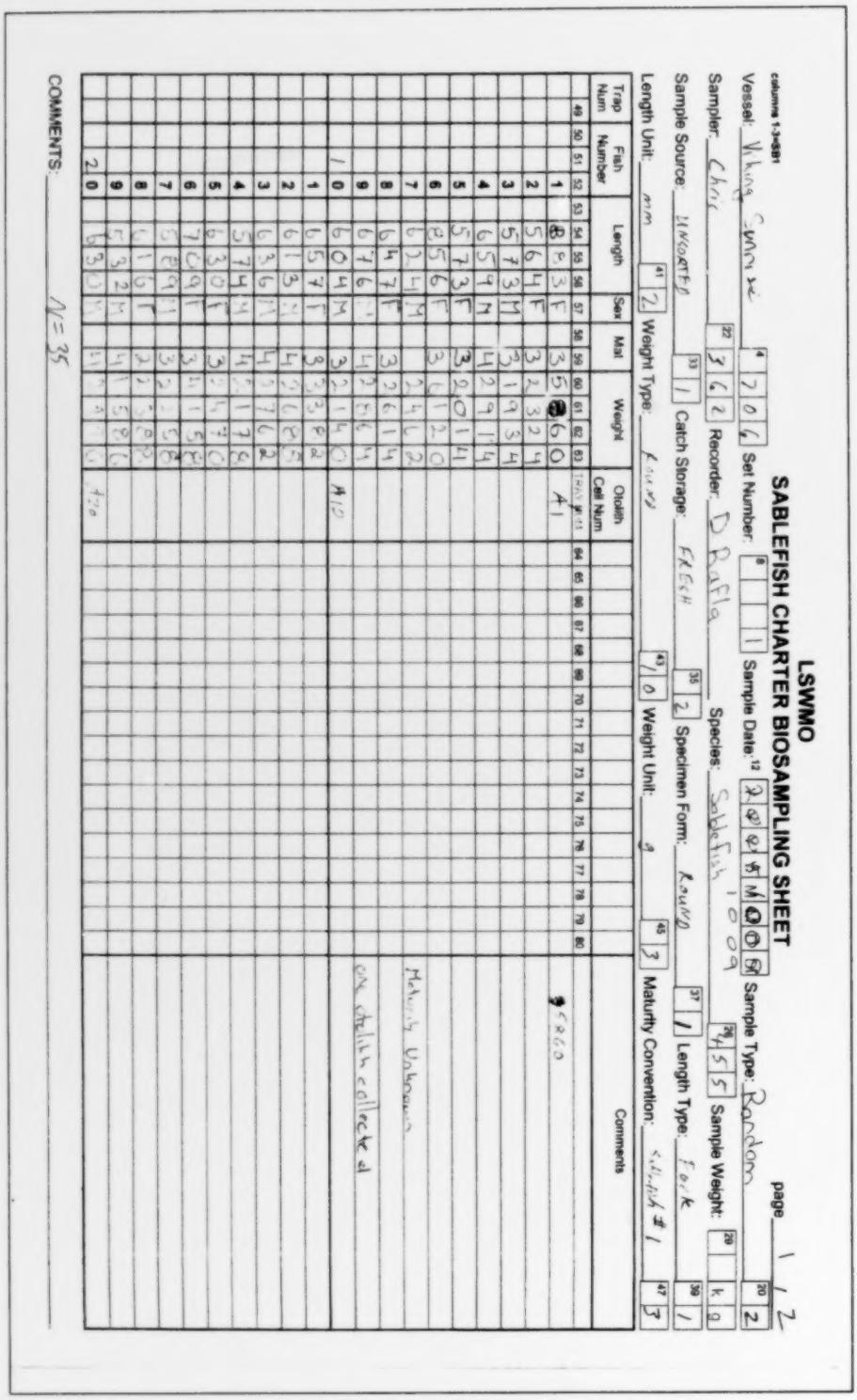
DATE: Oct 9 2005 SET NUMBER: 1 1 1 PG 1 1 1

VESSEL: Viking Sunrise RECORDER: MALCOLM

Trap Num	Species Code	Count	Weight (kg)	Verification Method	Trap Usability	Catch Comment	Trap Comment
1	455	5	14.2	01	01	D	
2	455	7	17.8			A	
3	999		.				
4	455	2	6.0			D	
5		7	15.7			A	
6		5	12.1			T	
7		3	6.8			D	
8		4	12.0			A	
9		7	14.7			T	
10		4	9.2			D	
11		2	.	9		A frames	
12		3	.	9		T frames	
13		7	27.0	01		D	
14		6	14.1			A	
15		5	13.2			T	
16		3	2.2			D	
17		4	5.0			A	
18		5	2.4			T	
19		2	3.3			A	
20		2	2.4			A	
21		6	10.5			T	
22		6	16.2			A	
23		5	6.2			A	Tag # 1752
24		1	.	09		T frames	
25		2	12.3	01	✓	A	
6	602	1	.	9		frames	
11		2	.	9		frames	
23	602	1	.	9			
2	10A	2	.	9		WHELK	
5	101	2	.	9		whelk	
8	10A	2	.	9		whelk	
11	2A6	1	0.6	1			
19	451	1	.	9			

SABLEFISH TOTAL 100 223.9

Figure C.4. Example of a completed catch log data entry form used during the 2005 survey.



LSWMO

SABLEFISH CHARTER BIOSAMPLING SHEET

page 1 of 2

Vessel: Viking Explorer — Set Number: 8 — Sample Date: 12 09 05 — Sample Type: Random — Sample Weight: 29 — 20 2

Sampler: Chris — Recorder: D Raffa — Species: Sablefish 1009 — 24 25 — Sample Weight: 29 — k g

Sample Source: UNGUTED — Catch Storage: FRESH — Specimen Form: Round — Length Type: Fork — 39 1

Length Unit: mm — Weight Type: Round — Weight Unit: g — Maturity Convention: California — 47 3

Trap Num	Fish Number	Length	Sex	Mat	Weight	Otolith Cell Num	Comments
1	1	585	F	3	3560	A1	♀ 5220
	2	564	F	3	2329		
	3	573	M	3	1934		
	4	659	M	4	2911		
	5	573	F	3	2011		
	6	556	F	3	1912		
	7	624	M	2	2462		
8	1	647	F	3	2614		Maturity Unknown
	2	676	M	4	2816		
	3	604	M	3	2140	A10	one otolith collected
10	1	657	F	3	3282		
	2	613	M	4	2683		
	3	636	M	4	2762		
	4	574	M	4	1786		
	5	630	F	3	2170		
	6	709	F	3	3152		
	7	589	M	3	2252		
	8	613	F	2	2280		
	9	632	M	4	2580		
	10	630	M	3	2520	120	

COMMENTS: N = 35

Figure C.5. Example of a completed biological sampling form used for LS(W)MO samples during the 2005 survey.

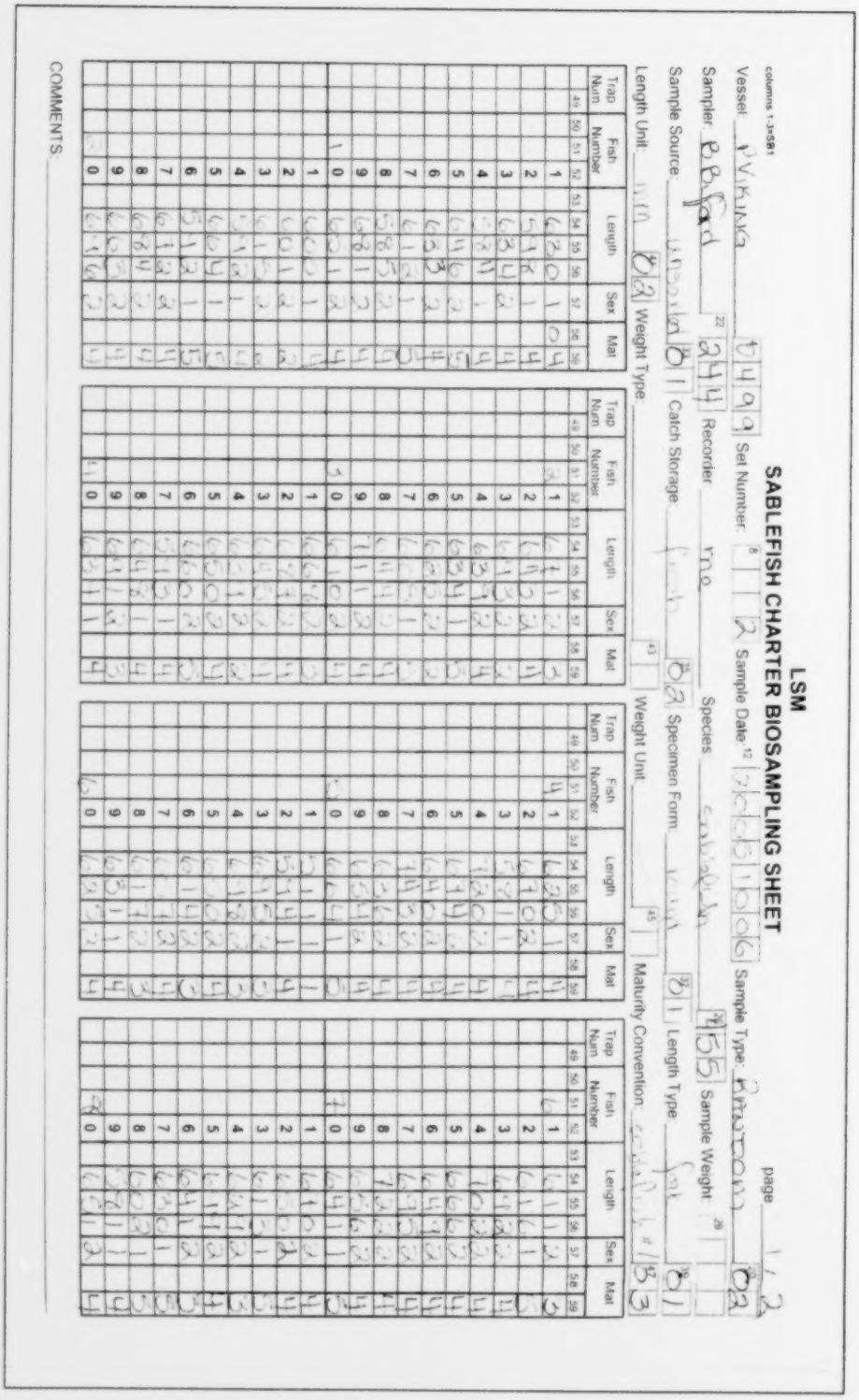


Figure C.6. Example of a completed biological sampling form used for LSM samples during the 2005 survey.

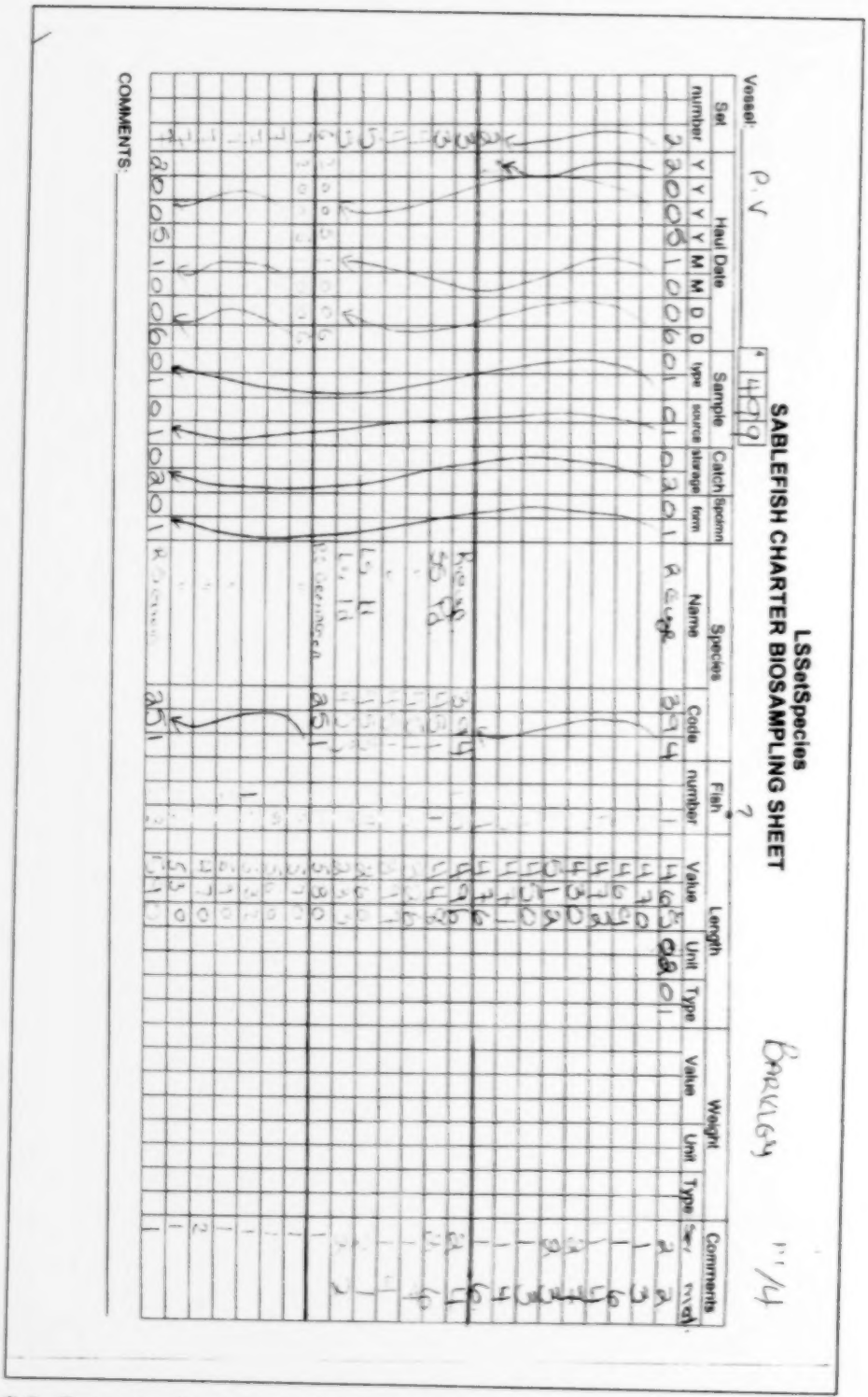


Figure C.7. Example of a completed biological sampling form used for samples of species other than sablefish during the 2005 survey.

Recovery sheet ID 2005.242

SABLEFISH CHARTER TAG RECOVERY SHEET

page 1 / 8

Vessel: VIKING SUNRISE | Sample Type: TAGGED FISH

Sampler: | Recorder: | Species: SABLEFISH | Sample Weight:

Sample Source: | Catch Storage: Fresh | Specimen Form: Round | Length Type: Fork

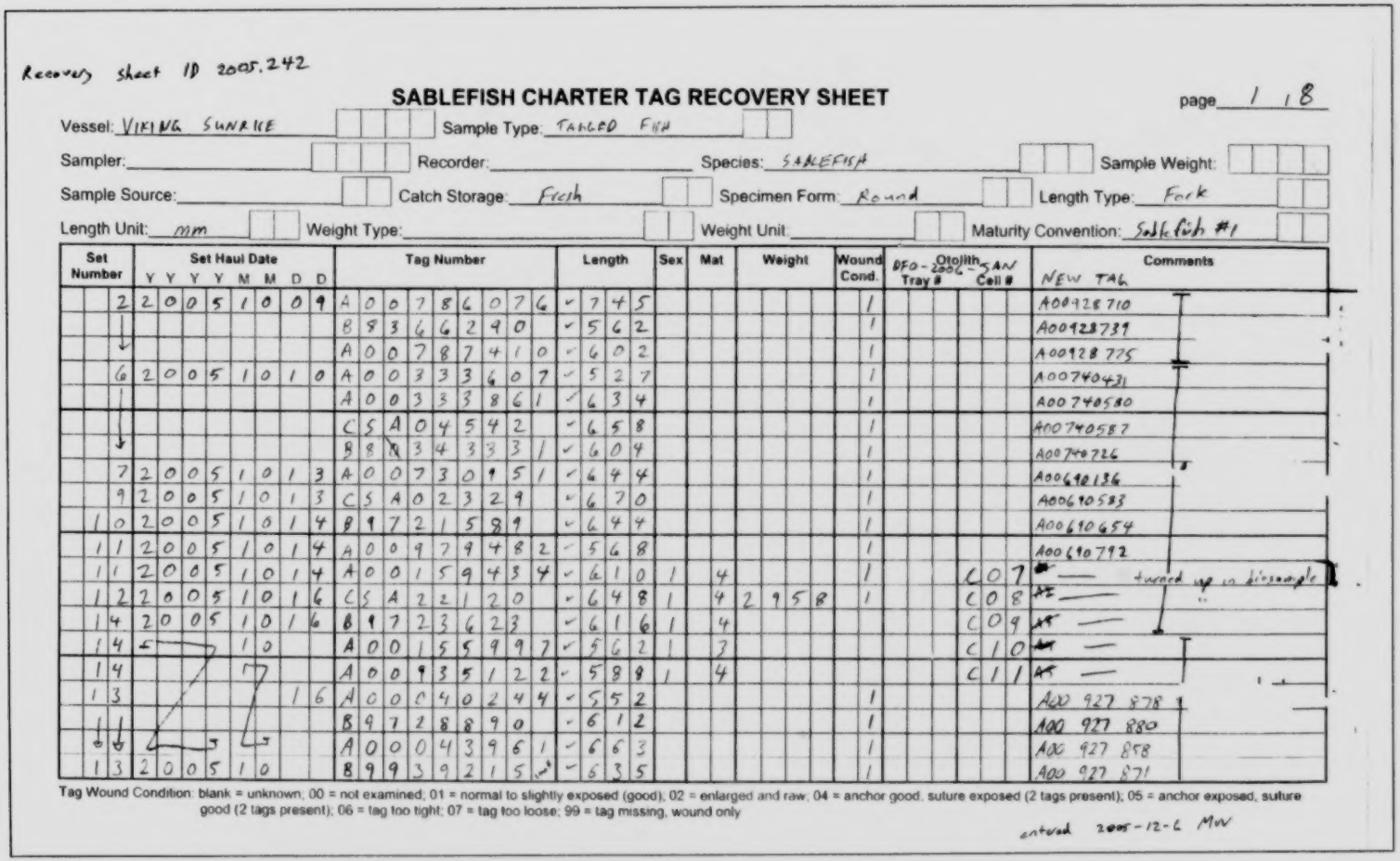
Length Unit: mm | Weight Type: | Weight Unit: | Maturity Convention: Sablefish #1

Set Number	Set Haul Date (YYYYMMDD)	Tag Number	Length	Sex	Mat	Weight	Wound Cond.	Otolith Tray # (BFO-2006-SAN)	Otolith Cell #	Comments
2	20050109	A00786076	✓745				1			NEW TAG A00928710
↓		B83662900	✓562				1			A00928739
		A00787410	✓602				1			A00928775
6	20050101	A00733360	✓527				1			A00740431
		A00733861	✓634				1			A00740580
↓		CSA045422	✓658				1			A00740587
		B8X33331	✓604				1			A00740726
7	20050113	A00730951	✓644				1			A00690136
9	20050110	CSA023290	✓670				1			A00690583
10	20050114	B97215899	✓644				1			A00690654
11	20050114	A00979482	✓568				1			A00690792
11	20050114	A00159434	✓610	1	4		1		C07	~~A2~~ — twisted up in bioswipe
12	20050116	CSA221200	✓648	1	4	2958	1		C08	~~A2~~ —
14	20050116	B97236233	✓616	1	4				C09	~~A5~~ —
14	10	A00155499 7	✓562	1	3				C10	~~A4~~ —
14		A00935122	✓588	1	4				C11	~~A5~~ —
13	16	AC0C40244	✓552				1			A00 927 578
		B97288902	✓612				1			A00 927 850
10		A00043961	✓663				1			A00 927 858
13	20050110	B99392154	✓635				1			A00 927 871

Tag Wound Condition: blank = unknown; 00 = not examined; 01 = normal to slightly exposed (good); 02 = enlarged and raw; 04 = anchor good, suture exposed (2 tags present); 05 = anchor exposed, suture good (2 tags present); 06 = tag too tight; 07 = tag too loose; 99 = tag missing, wound only

entered 2005-12-6 MW

Figure C.8. Example of a completed tag recovery form used during the 2005 survey.



Recovery sheet ID 2005.242

SABLEFISH CHARTER TAG RECOVERY SHEET

page 1 / 8

Vessel: VIKING SUNRISE Sample Type: TAGGED FISH

Sampler: Recorder: Species: SABLEFISH Sample Weight:

Sample Source: Catch Storage: Fresh Specimen Form: Round Length Type: Fork

Length Unit: mm Weight Type: Weight Unit: Maturity Convention: Sablefish #1

Set Number	Set Haul Date (YYYYMMDD)	Tag Number	Length	Sex	Mat	Weight	Wound Cond.	DFO-2006-SAN Otolith Tray #	DFO-2006-SAN Otolith Cell #	Comments
2	20050109	A00786076	745				1			NEW TAG A00928710
		B8362940	562				1			A00928739
↓		A0078741 0	602				1			A00928775
6	20050106	A0033360 7	527				1			A00740431
		A0033861	634				1			A00740580
		CSA04542	658				1			A00740587
↓		B8X33331	604				1			A00740726
7	20050103	A0073095 1	644				1			A00690136
9	20050103	CSA02329	670				1			A00690583
10	20050104	B9721589	644				1			A00690654
11	20050104	A0097748 2	568				1			A00690792
11	20050104	A0015943 4	610	1	4		1	C	07	— tossed up in discomple
12	20050106	CSA2212 0	648	1	4	2958	1	C	08	—
14	20050106	B9723623	616	1	4			C	09	—
14	10	A0015599 7	562	1	3			C	10	—
14		A0093512 2	588	1	4			C	11	—
13	16	A0004024 4	552				1			A00 927 878
		B9728890	612				1			A00 927 880
		A0040396 1	663				1			A00 927 858
13	20050110	B9932159	635				1			A00 927 871

Tag Wound Condition: blank = unknown; 00 = not examined; 01 = normal to slightly exposed (good); 02 = enlarged and raw; 04 = anchor good, suture exposed (2 tags present); 05 = anchor exposed, suture good (2 tags present); 06 = tag too tight; 07 = tag too loose; 99 = tag missing, wound only

entered 2005-12-6 MW

Figure C.9. Example of a completed tagging form used during the 2005 survey.

APPENDIX D CHARTER VESSEL DECK DIAGRAMS

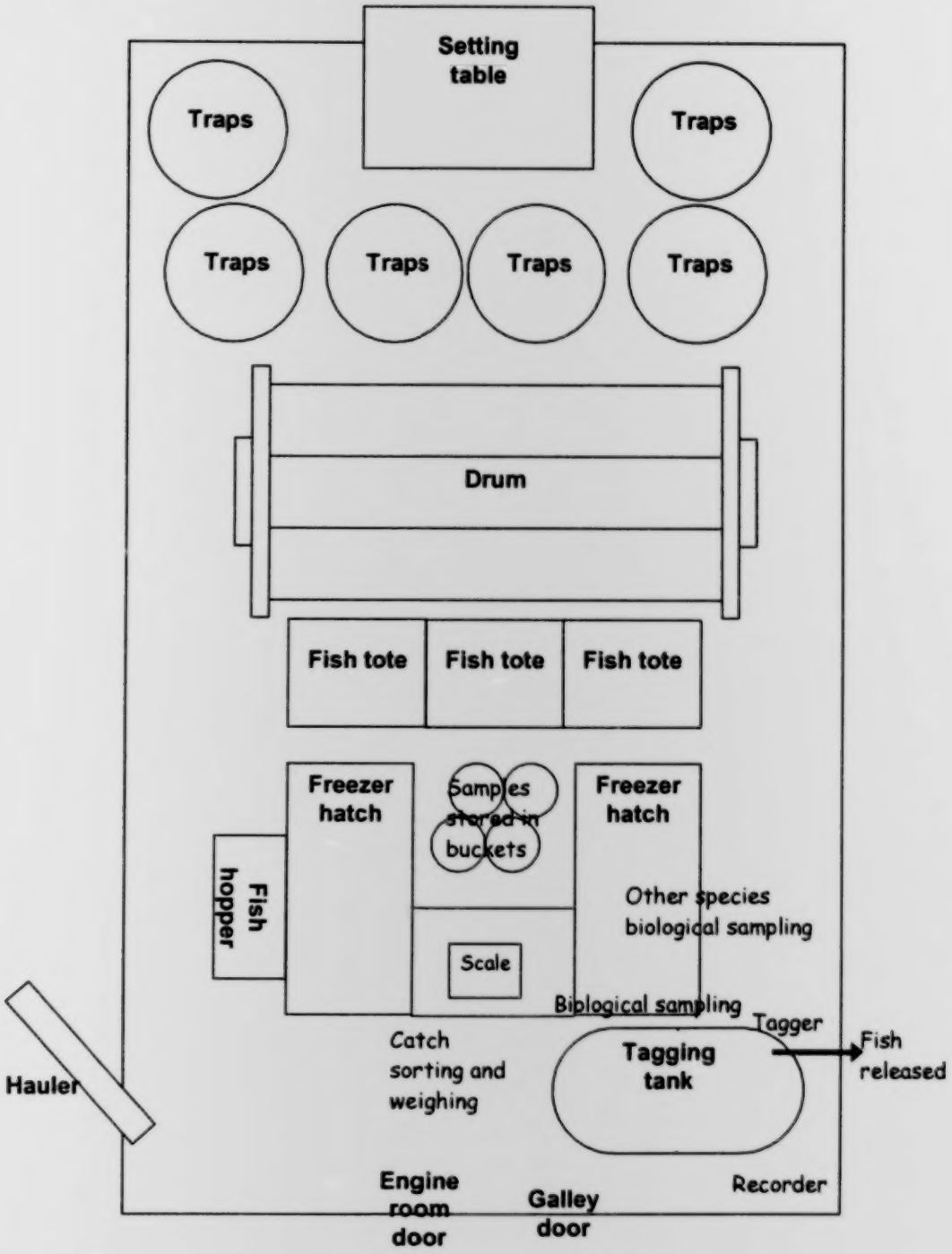


Figure D. 1. Diagram of the F/V Pacific Viking deck showing how the space was used for survey activities. The diagram is not to scale.

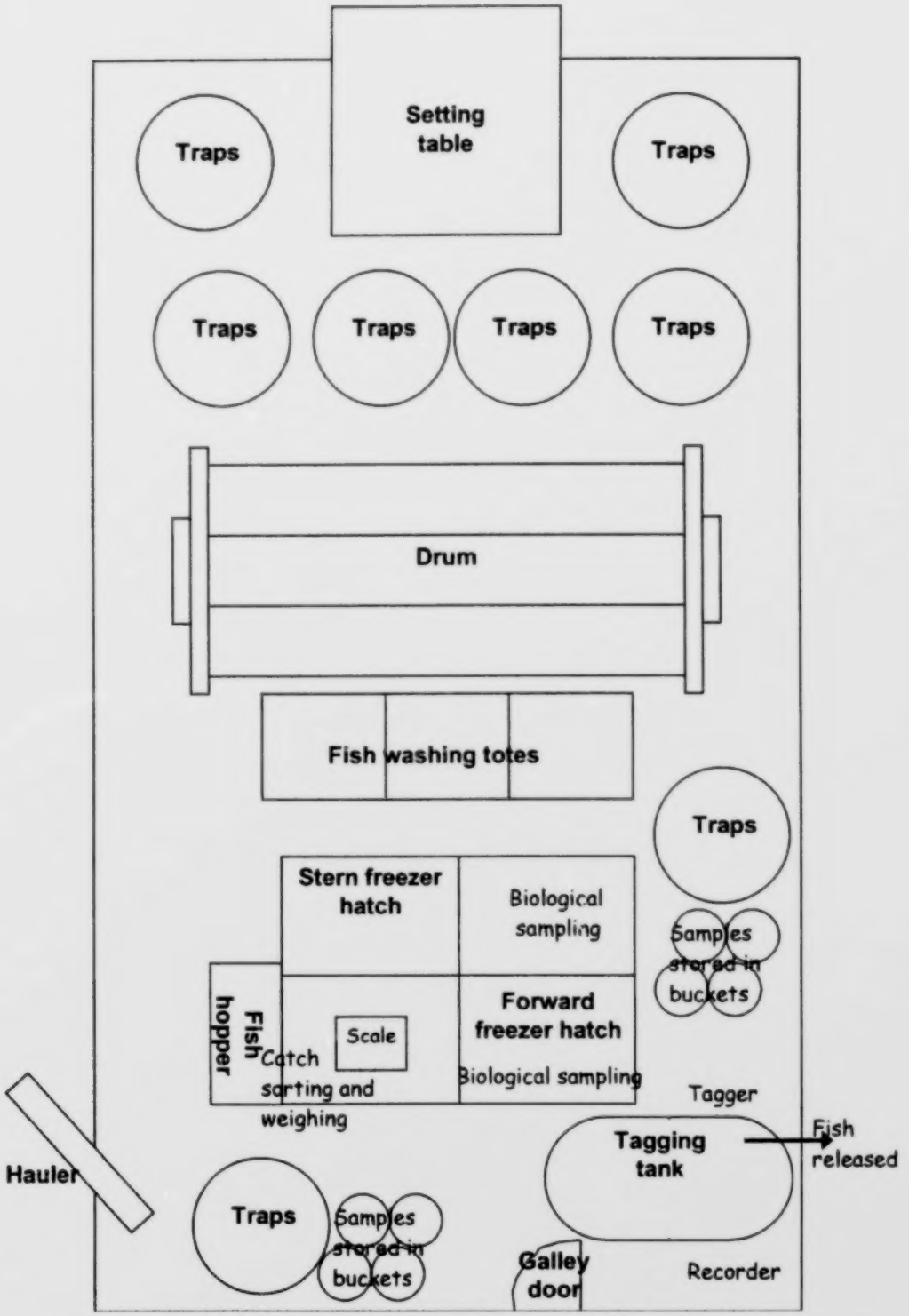


Figure D. 2. Diagram of the F/V Viking Sunrise deck showing how the space was used for survey activities. The diagram is not to scale.

APPENDIX E SABLEFISH GONAD MATURITY STAGES

Maturity stage	Code	Males	Females
Immature 1	01	very thin string-like >1 mm thick, translucent white colour	thin string-like =1.5mm thick mid-section, translucent-white colour
Immature 2	02	thin string-like 3mm thick, extends length of cavity, white-translucent colour	thickened >5mm, does not extend length of cavity, some folds sausage like translucent-white colour
Ripening 1	03	thick >10mm visible folds, white smooth texture, =20% body cavity	eggs present, white opaque colour encased in translucent sock, <25% of body cavity
Ripening 2	04	as above but with blood vessels present on surface, >30% body cavity	eggs larger =1mm diameter, white in colour, blood vessels present on surface, >25% of body cavity
Ripe	05	as above blood vessels present, folds delicate, some sperm may flow, >40% of body cavity	eggs at least 1mm diameter, white in colour, gonad full size, >50% of body cavity
Ripe 1	06	no stage in males	gonad same size as above but at least 25% of eggs have become translucent
Ripe 2	07	no stage in males	gonad same size as above but at least 50% of eggs have become translucent
Running Ripe	08	lobes fully developed, sperm is released when slight pressure is applied to external posterior region of body cavity	stream of translucent eggs released when slight-moderate pressure is applied to external posterior region of body cavity
Spent	09	lobes or folds are bloodshot, some sperm may be present when moderate pressure is applied to external posterior region of body cavity	gonad is red-purple in colour, residual eggs may be present, outer wall of gonad flaccid
Resorbing	10	no stage in males	eggs present but did not function normally (not normal)
Recovering	11	lobes flat, brown in colour, bloodshot appearance on edges and ends of lobes	still some red purple colour, not flaccid, whitish sheen to exterior surface
Resting	12	firm, light brown colour, some wrinkles on surface	smooth elongated and round in shape, brown purple pulp interior, exterior surface has whitish sheen

APPENDIX F SUMMARY OF TRAP USE DURING THE 2005 STANDARDIZED CHARTER (F/V PACIFIC VIKING)

The fate of the sablefish catch for each trap within each set is indicated using the following abbreviations:

Code	Sablefish use category
D	Discarded after weighing (processed as commercial catch)
A	Sampled for LSM(W)O
B	Sampled for LSM
T	Tagged and released
-	No sablefish catch
blank	Trap missing or not fishing

Trap numbers are arranged in rows and each column is a set. The total numbers of traps assigned to each use category within each set are also shown.

	Set																													
Trap	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**
1	-	B	B	B	A	A	-	A	A	B	A	B	A	B	-	-	A	B	B	-	A	-	A	A	A	B	A	A	-	A
2	A	A	A	D	A	B	A	B	A	-	B	A	A	A	-	-	B	A	A	A	-	-	B	A	B	A	A	B	-	A
3	A	B	D	A	B	A	A	A	A	A	A	B	B	-	-	-	A	B	B	-	A	-	B	A	A	D	B	A	-	A
4	-	-	A	B	B	B	A	A	B	A	A	A	B	B	-	-	B	-	D	-	-		A	A	B	B	B	B	-	B
5	-	A	B	D	A	A	A	-	A	A	A	A	A	A	-	-	A	A	A	A	-	A	-	-	B	D	A	-	-	A
6	A	-	D	A	B	B	B	-	A	A	A	A	B	B	-	-	A	A	B	A	A	-	-	A	A	D	A	A	-	B
7	-	B	B	B	A	A	A	-	A	A	B	B	B	A	-	-	B	B	D	-	A	A	A	A	B	D	B	A	A	A
8	A	B	D	D	A	A	A	A	A	A	-	A	A	B	A	-	-	A	B	A	A	-	A	B	A	A	B	A	-	A
9	A	A	A	A	B	A	-	-	A	B	A	A	A	B	-	-	-	B	D	A	-	A	-	-	A	D	A	B	A	B
10	A	B	B	B	A	B	A	A	A	B	A	-	B	A	-	-	A	A	B	A	-	-	-	A	B	D	A	A	A	B
11	A	-	A	B	B	A	A	-	B	-	A	-	A	B	-	-	A	A	D	B	-	-	-	B	A	B	A	B	-	A
12	A	A	D	A	A	B	A	A	A	A	A	A	-	A	A	-	A	B	B	A	-	-	-	A	B	D	A	A	-	B
13	-	-	A	B	-	B	A	-	-	A	-	B	B	A	-	A	A	B	D	A	A	A	A	A	A	D	B	B	A	A
14	A	B	B	A	A	A	A	-	A	B	A	A	B	B	-	-	A	B	B	A	A	A	A	B	A	D	B	B	A	B
15	-	B	B	B	A	B	A	A	A	A	A	B	A	D	-	-	A	-	D	A	A	-	-	A	B	D	B	A	A	B
16	A	B	D	A	A	A	A	-	A	B	B	A	B	B	-	-	B	B	D	A	-	-	A	B	B	D	-	B	-	B
17	A	A	D	A	A	B	A	-	A	A	A	B	B	D	-	-	-	D	D	B	A	-	-	A	B	D	D	B	A	B
18	-	A	D	B	B	A	A	-	A	A	A	A	A	B	-	-	-	-	D	A	A	-	-	-	B	D	D	B	A	B
19	-	B	B	A	B	B	A	A	-	B	A	B	B	B	-	A	-	B	D	A	-	-	-	A	B	D	D	B	-	B
20	-	B	A	B	A	B	A	-	A	B	B	B	-	D	-	-	A	D	D	A	-	-	A	B	B	D	D	B	-	B
21	-	-	B	A	B	D	A	-	B	A	A	A	B	B	-	-	-	D	D	-	-	A	A	B	B	D	D	D	A	B
22	A	-	D	B	A	D	A	-	-	B	A	A	B	B	-	-	-	A	D	-	A	-	-	A	B	D	D	D	-	D
23	A	B	D	B	B	D	B	-	B	B	A	B	B	D	A	-	A	D	D	-	-	A	A	A	B	D	D	D	A	D
24	A	B	D	D	A	D	A	A	B	B	B	A	B	D	-	-	-	D	D	-	-	-	A	B	B	D	D	D	-	D
25	-	B	D	D	B	B	B	A		B	-	B	B	B	-	-	-	-	-	-	-		-	B	B	D	D	D	-	-
26															-	-														
Totals																														
-	11	6			1		2	14	3	2	3	2	2	1	23	24	9	4	1	9	14	16	12	3			1	1	15	1
A	14	6	6	9	14	10	20	10	16	12	17	13	8	6	3	2	12	7	2	14	11	7	11	14	8	2	8	8	10	8
B		13	8	11	10	11	3	1	5	11	5	10	15	13			4	9	7	2			2	8	17	3	7	11		13
D			11	5		4								5				5	15							20	9	5		3

Trap	Set 31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
1	A	A	B	A	A	A	-	-	A	A	B	A	-	A	A	B	B	A	-	A	-	-	A	A	A	A	-	-	-	A
2	A	B	A	A	B	-	-	A	-	B	A	B	A	A	A	A	A	A	-	A	-	-	A	A	B	B	-	A	A	-
3	B	A	A	B	A	A	A	-	A	B	B	B	-	A	B	A	B	-	A	A	A	A	A	A	B	B	-	-	-	-
4	B	B	B	A	-	-	-	A	-	A	B	A		A	A	B	D	-	A	-	-	A	A	B	A	A	-	-	-	A
5	A	D	A	B	B	A	-	-	B	B	A	B	-	-	B	A	A	A	-	A	-	A	A	-	A	B	-	-	-	A
6	B	D	B	A	-	A	-	-	A	A	D	A	-	A	B	B	B	A	-	-	-	A	B	B	A	B	-	-	-	-
7	A	D	B	B	-	A	-	-	A	B	B	B	-	-	B	A	D	-	-	A	-	-	A	B	A	B	-	-	-	-
8	B	D	B	A	A	A	-	-	B	A	A	D	-	-	A	-	D	-	-	-	-	A	A	A	A	A	-	-	A	-
9	B	D	B	B	B	A	A	A	B	B	B	A	-	A	D	A	A	-	A	-	A	A	A	A	B	B	-	A	-	-
10	D	D	B	B	A	A	A	A	A	B	A	B	-	-	D	B	B	A	A	-	-	-	A	B	B	A	-	-	-	A
11	D	D	D	A	A	-	A	A	-	B	A	A	-	A	D	D	A	A	A	-	A	D	B	D	-	D	-	A	-	-
12	A	D	D	B	-	A	A	-	B	B	B	B	-	A	D	A	D	A	-	-	-	A	A	D	-	-	-	-	-	A
13	D	D	D	B	-	-	A	A	B	D	D	A	-	-	D	B	D	-	A	A	-	-	-	D	D	A	-	-	A	-
14	D	D	D	-	A	A	A	-	A	D	A	B	-	-	D	D	D	-	-	A	-	A	A	D	D	D	A	-	-	-
15	D	D	D	B	A	-	-	A	-	D	D	D	-	-	D	D	B	-	A	A	A	-	A	D	D	D	-	-	A	A
16	D	D	A	A	A	A	-	A	B	D	D	D	-	-	D	D	D	-	-	A	-	A	A	D	D	D	-	-	-	-
17	D	D	A	B	A	-	-	A	B	D	B	D	-	-	D	A	D	A	-	-	-	-	A	D	D	D	-	-	-	-
18	D	D	D	B	-	A	-	-	A	D	D	D	A	-	D	D	-	-	A	-	-	-	-	D	D	D	-	-	-	-
19	D	D	D	D	A	A	A	A	B	D	D	A	-	-	D	A	A	A	-	-	A	-	A	D	B	D	-	A	-	-
20	D	D	D	D	-	A	A	-	B	D	D	D	-	-	D	B	D	-	A	A	A	A	A	D	D	D	-	A	A	A
21	D	B	D	D	-	A	-	-	B	D	D	D	-	-	-	D	D	-	A	-	-	-	-	D	D	D	-	-	-	-
22	D	D	D	D	-	-	-	-	-	D	D	D	-	-	D	D	D	-	-	A	-	A	-	D	D	D	-	-	-	A
23	D	D	D	D	A	A	-	-	B	D	D	D	-	A	D	D	D	A	A	-	-	-	A	D	D	D	-	A	A	A
24	D	D	D	D	-	-	-	-	B	D	D	D	-	-	D	D	D	-	-	-	-	-	-	D	D	D		-	-	-
25	D	D	-	D	-	A	-	-	B	D	D	D	A	-	D	D	D	-	A	-	-	A	-	D	A	-			-	A
Totals																														
-				1	1	11	8	16	15	5				21	16	1	1	1	15	13	14	19	12	6	1		1	22	18	19	15
A	5	2	5	7	11	17	9	10	7	4	6	7	3	9	4	8	5	10	12	11	6	13	17	5	7	5	1	6	6	10
B	5	3	7	10	3				13	8	7	7			4	6	5						2	4	7	6				
D	15	20	12	7						13	12	11			16	10	14							15	11	13				

	Set																							
Trap	**61**	**62**	**63**	**64**	**65**	**66**	**67**	**68**	**69**	**70**	**71**	**72**	**73**	**74**	**75**	**76**	**77**	**78**	**79**	**80**	**81**	**82**	**83**	**84**
1	A	A	A	-	-	A	T	A	T	T	T	A	T	A	T	A	T	A	T	A	T	A	T	-
2	A	-	-	A	-	T	-	T	A	A	A	T	A	-	A	T	A	T	A	T	-	T	A	T
3	B	-	A	-	-	-	T	A	T	T	T	A	T	A	T	A	T	D	T	-	T	A	T	A
4	A	-	A	-	A	T	A	T	A	A	A	T	A	T	A	T	A	T	A	-	-	T	A	-
5	A	A	A	-	-	A	T	-	T	T	T	A	T	A	T	D	T	A	T	A	T	A	T	-
6	A	A	A	-	A	T	A	T	D	A	A	T	-	T	A	T	A	T	A	T	A	-	A	T
7	-	A	A	-	T	-	T	D	T	T	T	D	T	D	-	D	T	A	T	A	T	A	T	A
8	-	A	A	-	-	-	A	T	D	A	D	T	D	T	D	T	D	T	D	-	A	T	D	T
9	A	A	A	-	-	A	T	D	T	T	T	-	T	D	T	D	T	A	T	-	-	-	T	-
10	A	-	A	-	A	T	A	T	D	D	D	T	D	T	D	T	D	T	D	-	A	T	D	T
11	A	A	A	-	-	A	T	D	T	T	T	D	T	D	T	D	T	D	T	A	T	A	T	D
12	A	B	-	-	A	T	D	T	D	D	D	T	D	T	D	T	D	T	D	T	A	T	D	-
13	B	A	A	A	-	-	T	D	T	T	T	D	T	D	T	D	T	D	T	A	T	A	T	D
14	A	A	A	A	A	-	A	T	D	D	D	T	D	T	D	T	D	T	D	T	A	T	D	T
15	A	A	-	-	-	A	-	D	T	T	T	D	T	D	T	D	T	D	T	A	T	A	T	D
16	B	B	A	-	A	-	D	T	D	D	D	T	D	T	D	T	D	T	D	-	A	T	D	T
17	A	A	A	-	-	-	T	D	T	T	T	D	T	D	T	D	T	D	T	-	T	D	T	D
18	B	A	-	A	-	T	-	T	D	D	D	T	D	T	D	T	D	T	D	T	-	T	D	T
19	B	-	A	A	-	-	-	D	T	T	T	D	T	D	T	D	T	D	T	A	-	D	T	D
20	B	A	A	-	-	-	D	T	D	D	D	T	D	T	D	T	D	T	D	T	-	T	D	T
21	B	A	A	A	-	-	A	D	T	T	T	D	T	D	T	-	T	D	T	A	T	D	T	D
22	B	B	A	-	-	T	T	-	D	D	D	T	D	T	D	T	D	T	D	T	A	T	D	T
23	B	A	A	-	T	A	-	D	T	T	T	D	T	D	T	-	T	D	T	A	-	D	T	D
24	D	B	A		-	T	-	T	D	D	D	T	D	T	D	T	D	T	D	T	A	T	D	-
25	D	B	A		-	A	-	-	T	T	-	D	T	D	T		T	D	T	A	T	D	-	D
Totals																								
-	2	5	4	17	17	10	7	3			1	1	1	1	1	2				7	7	2	1	6
A	12	15	21	6	6	7	6	2	2	4	3	3	2	3	3	2	3	4	3	10	8	7	3	2
B	9	5																						
D	2						3	9	10	8	9	9	9	10	9	8	9	9	9			5	9	8
T	n/a	n/a	n/a	n/a	2	8	9	11	13	13	12	12	13	11	12	12	13	12	13	8	10	11	12	9

APPENDIX G SUMMARY OF TRAP USE DURING THE 2005 TAGGING CHARTER (F/V MILBANKE SOUND) TYPE 3 TAGGING SETS

The fate of the sablefish catch for each trap within each set is indicated using the following abbreviations:

Code	Sablefish use category
D	Discarded after weighing (processed as commercial catch)
A	Sampled for LSM(W)O
B	Sampled for LSM
T	Tagged and released
-	No sablefish catch
blank	Trap missing or not fishing

Trap numbers are arranged in rows and each column is a set. The total numbers of traps assigned to each use category within each set are also shown.

	Set																								
Trap	**1**	**2**	**3**	**4**	**5**	**8**	**9**	**10**	**11**	**12**	**13**	**15**	**16**	**17**	**18**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**
1	D	T	A	T	T	T	D	T	D	A	T	A	D	T	-	A	T	D	D	T	A	T	-	A	A
2	A	D	T	D	D	D	A	D	A	T	D	T	A	D	D	T	A	A	A	-	T	D	D	T	T
3	-	A	D	A	A	A	T	A	T	D	A	D	T	A	-	D	A	T	T	A	D	A	A	D	D
4	D	T	A	T	T	T	D	T	D	A	T	A	D	T	T	A	T	D	D		A	T	T	A	A
5	A	D	T	D	D	D	A	D	D	T	D	T	D	D	D	T	D	D	A	D	T	D	-	T	-
6	T	A	D	A	A	A	T	A	T	D	D	D	T	A	-	D	A	T	T	A	D	A	A	D	A
7	D	T	A	T	T	T	D	T	D	A	T	A	D	T	T	A	T	D	D	T	D	T	-	A	A
8	A	D	T	D	D	D	A	D	A	T	D	-	D	D	D	T	D	A	A	D	T	D	D	T	-
9	T	D	D	A	A	D	T	A	T	D	A	D	T	D	A	D	A	T	T	D	D	A	A	D	D
10	D	T	A	T	T	T	D	T	D	D	T	A	D	T	T	A	T	D	D	T	D	T	T	-	D
11	A	D	T	D	D	D	A	D	D	T	D	T	-	D	D	T	D	A	A	D	T	D	D	T	T
12	T	A	D	A	A	D	T	A	T	D	D	-	T	A	A	A	A	T	T	A	D	A	A	D	D
13	D	T	A	T	T	T	D	T	D	-	T	A	D	T	T	-	T	D	D	T	D	T	T	A	A
14	A	D	T	D	D	D	D	D	D	T	D	-	D	D	D	T	D	D	A	D	T	D	D	T	T
15	T	D	D	A	D	A	T	A	T	-	D	-	T	A	A	A	A	T	T	D	D	D	D	D	D
16	A	T	D	T	T	T	D	T	D	-	T	D	D	T	T	A	T	D	D	T	A	T	T	D	D
17	A	D	T	D	D	D	D	D	A	-	D	T	D	D	D	T	D	A	A	D	T	D	-	T	T
18	T	A	D	D	D	D	T	A	T	-	D	D	T	A	A	A	A	T	T	D	D	D	A	D	D
19	A	T	D	T	T	T	D	T	D	-	T	D	D	T	T	A	T	D	D	T	D	T	T	A	D
20	A	D	T	D	D	D	D	A	D	-	D	T	A	D	D	T	D	A	D	D	T	D	D	T	T
21	T	D	D	D	A	D	T	A	T	-	A	D	D	D	A	A	D	T	T	D	D	D	D	D	D
22	A	T	D	T	T	T	D	T	D	-	T	-	T	T	T	A	T	D	D	T	A	T	T	A	A
23	A	D	T	D	D	D	D	D	D	-	D	T	D	D	D	T	-	A	A	D	T	D	-	T	T
24	T	D	D	D	D	D	T	D	T	-	D	D	-	D	A	D	D	T	T	D	D	D	D	-	D
25	A		D	T	T		D	T	D	-	T	D	T	T	-	D	T	D	D	T		T	T	A	A
26								D						D											
27								D																	
Totals																									
-	1									12		5	2		4	1	1			1			5	2	2
A	12	4	5	5	5	3	4	8	3	3	3	5	2	5	6	11	7	6	7	3	4	4	5	7	7
D	5	12	12	11	11	13	13	10	14	5	13	9	13	12	8	5	8	11	10	12	12	12	8	8	10
T	7	8	8	9	9	8	8	9	8	5	9	6	8	9	7	8	9	8	8	8	8	9	7	8	6

	Set																									
Trap	**31**	**32**	**34**	**35**	**36**	**38**	**39**	**40**	**41**	**43**	**44**	**45**	**46**	**48**	**49**	**50**	**51**	**52**	**53**	**54**	**55**	**56**	**57**	**58**	**59**	**60**
1	A	D	T	D	D	-	T	A	D	T	T	T	-	A	A	D	T	A	-	A	A	A	T		-	D
2	T	A	A	-	A	-	D	-	A	-	D	D	A	T	T	A	D	T	T	T	T	T	D		-	A
3	D	T	A	T	T	-	A	-	T	A	A	A	A	D	D	T	A	D	A	D	-	D	A	A	-	T
4	A	D	T	D	D	-	T	A	D	T	T	T	-	A	A	D	T	-	A	A	-	D	T	A	-	D
5	T	D	A	A	D	-	D	A	A	A	D	D	A	T	T	D	D	T	-	T	T	T	D	T	-	D
6	-	T	D	-	T	-	A	T	T	-	A	D	A	D	D	T	A	A	A	D	-	D	A	A	A	T
7	-	D	T	-	D	A	T	-	D	-	T	T	T	A	D	D	T	A	A	A	-	-	T	A	T	A
8	-	D	D	A	D	-	D	A	D	-	D	D	D	T	T	A	D	T	T	-	-	T	D	T	-	D
9	A	T	A		T	-	A	T	T	A	A	D	A	D	D	T	D	-	-	D	-	D	D	A	-	T
10	A	D	T	-	D	A	T	D	D	T	T	T	-	A	A	D	T	A	-	A	-	A	T	A	-	D
11	T	D	D	-	D	-	D	-	A	A	D	D	A	T	T	D	D	T	T	T	-	T	D	T	-	D
12	-	T	A	-	T	-	A	T	T	A	A	D	A	D	D	T	D	A	-	D	-	D	D	A	-	T
13	-		T	-	D	A	T	A	D	T	T	T	T	D	A	D	T	A	-	A	-	D	T	A	T	D
14	-		D	-	D	-	D	A	D	A	D	D	A	T	T	D	D	T	-	T	T	T	D	-	-	D
15	-		D	-	T	-	A	T	T	A	A	D	A	D	D	T	D	D	-	D	-	D	A	-	A	T
16	-		T	A	D	A	T	D	D	T	T	T	-	D	D	D	T	A	-	A	-	D	T	A	T	D
17	T		D	-	A	-	D	A	A	A	D	D	A	T	T	D	D	-	-	T	-	T	D	T	A	D
18	A	T	D	T	T	A	A	T	T	A	D	D	A	D	D	T	D	A	-	D	-	D	D	A	-	T
19	-		T	-	D	A	T	-	D	T	T	T	T	D	A	D	T	A	A	A	-	A	T	A	-	D
20	T	D	D	-	D	T	D	A	A	-	D	D	D	T	T	D	D	T	T	T	-	-	D	T	-	A
21	A	T	D	-	T	-	D	T	T	A	A	A	A	D	D	T	D	D	-	A	-	D	D	-	A	T
22	-		T	-	D	-	-	D	D	T	T	T	-	D	A	D	T	D	A	-	-	A	T	-	-	D
23	-		D	-	D	T	D	D	D	A	D	D	-	T	T	D	D	T	T	T	-		A	T	A	D
24	-		D	-	T	-	D	-	T	A	D	D	-	D	D	D	D	-	A	A	-	D	A	A	-	T
25	-		T	A	D	-	-	D	A	T	T	T	T	D	D	T	T	D	A	A	-	A		-	T	D
Totals																										
-	13			16		17	2	6		5			7					4	12	2	21	2		5	16	
A	6	1	5	4	2	6	6	8	6	12	6	2	12	4	6	2	2	9	8	10	1	5	5	12	5	3
D	1	8	11	2	15		10	5	11		10	14	2	13	11	15	14	5		6		11	11			14
T	5	6	9	2	8	2	7	6	8	8	9	9	4	8	8	8	9	7	5	7	3	6	8	6	4	8

	Set																						
Trap	**62**	**63**	**64**	**66**	**67**	**68**	**69**	**71**	**72**	**73**	**74**	**75**	**77**	**78**	**79**	**80**	**81**	**82**	**83**	**84**	**85**	**87**	**88**
1	T	T	-	D	D	-	T	-	-	-	D	D	A	-	-	-	A	T	-	A	T	A	D
2	D	-	-	-	D	A	-	-	-	T	A	A	A	A	-	A	-	-	-	A	A	A	A
3	A	A	T	-	T	T	A	D	T	-	T	T	T	-	A	T	A	-	-	T	A	T	T
4	T	T	A	-	D	-	-	-	A	A	D	D	D	T	A	A	A	-	-	D	T	A	D
5	D	A	A	-	A	A	T	-	A	-	A	A	A	A	T	-	T	-	-	A	A	A	A
6	D	-	-	-	T	T	A	T	T	-	T	T	T	A	D	-	A	A	-	T	A	T	T
7	T	-	-	-	D	D	T	-	A	-	D	A	D	T	D	-	A	-	-	D	-	A	D
8	-	A	-	A	A	A	D	-	A	T	D	-	A	A	T	-	-	-	-	A	A	A	D
9	D	-	T		-	T	D	A	T	A	T	T	T	A	D	-	A	-	-	T	-	T	T
10	T	-	A	A	D	D	T	-	A	-	D	A	D	-	-	-	A	-	-	D	T	D	D
11	D	A	A	A	A	A	D	T	A	T	A	A	D	A	T	-	T	-	-	A	A	-	D
12	D	-	T	-	T	T	A	-	T	A	T	T	T	A	-	T	A	-	-	T	A	T	T
13	T	-	A	A	D	D	T	-	D	A	D	D	-	T	D	-	D	T	-	D	T	A	D
14	D	-	A	-	D	A	-	-	D	-	A	A	D	A	T	-	T	-	-	A	A	A	D
15	A	-	T	T	T	T	D	-	T	A	T	T	T	A	D	-	D	-	-	T	A	T	T
16	T	-	D	-	D	D	T	-	D	A	D	D	D	T	A	-	D	-	-	D	-	-	D
17	D	-	A	-	D	A	D	-	D	T	D	A	A	-	T	A	T	-	-	A	-	-	A
18	D	-	-	-	T	-	D	-	T	D	T	T	T	-	D	T	D	-	-	T	-	T	T
19	T	-	A	A	D	D	T	-	D	A	D	D	D	-	-	A	D	-	-	D	T	-	D
20	D	-	A	-	D	A	D	-	A	T	D	A	A	-	T	-	T	-	-	A	-	A	A
21	A	A	T	T	T	T	D	A	D	D	T	T	T	A	D	-	D	-	-	T	-	-	T
22	-	-	D	A	D	-	T	-	-	-	D	D	D	-	A	A	D	-	-	D	-	A	D
23	D	-	A	A	-	-	A	-	-	T	A	A	A	-	T	A	T	-	-	A	-	A	D
24	D	-	T	-	T	-	-	-	-	-	T	T	T	A	D	-	D		-	T	D	T	T
25	T	-	D	A	A	-	-	-		-		D	D	T	D	A	D		A	D	T	A	D
26																				D			
27																				D			
Totals																							
-	2	18	6	13	2	7	5	20	5	10		1	1	9	5	15	2	20	24		9	5	
A	3	5	10	8	4	7	4	2	7	7	5	9	7	11	4	7	8	1	1	9	9	12	4
D	12		3	1	12	5	8	1	6	2	11	7	9		9		9			10	1	1	13
T	8	2	6	2	7	6	8	2	6	6	8	8	8	5	7	3	6	2		8	6	7	8

APPENDIX H SUMMARY OF TRAP USE DURING THE 2005 TAGGING CHARTER (F/V MILBANKE SOUND) TYPE 1 TAGGING SETS

The escape ring treatment of the traps is shown in parentheses (no parentheses indicate no escape ring treatment).
The fate of the sablefish catch for each trap within each set is indicated using the following abbreviations:

Code	Sablefish use category
D	Discarded after weighing (processed as commercial catch)
S	Sampled for LSG as part of the escape ring study
T	Tagged and released
-	No sablefish catch
blank	Trap missing or not fishing

Trap numbers are arranged in rows and each column is a set. The total numbers of traps assigned to each use category within each set are also shown.

	Set													
Trap	**6**	**7**	**14**	**19**	**30**	**33**	**37**	**42**	**47**	**61**	**65**	**70**	**76**	**86**
1	T	-	T	T	T	T	T	T	T	T	T	T	D	
2	T	T	T	T	T	T	T	T	T	T		T	T	T
3	T	T	T	T	T	T	T	T	T	T	T	T	T	T
4	T	-	T	T	T	T	T	T	T	T		T	T	T
5	T	T	T	T	T	T	T	(E4)S	T	T	T	(E4)S	T	T
6	(E4)S	(E4)S	(E4)S	(E4)S	T	(E4)S	(E4)S	(E3)S	(E4)S	T	T	(E3)S	(E4)S	T
7	(E3)S	(E3)S	(E3)S	(E3)S	(E4)S	(E3)S	(E3)S	(E2)S	(E3)S	(E4)S	T	(E2)S	(E3)S	T
8	(E2)S	(E2)S	(E2)S	(E2)S	(E3)S	(E2)S	(E2)S	(E1)S	(E2)S	(E3)S	T	(E1)S	(E2)S	(E1)S
9	(E1)S	(E1)S	(E1)S	(E1)S	(E2)S	(E1)S	(E1)S	T	(E1)S	(E2)S	T	T	(E1)S	(E2)S
10	T	T	T	T	(E1)S	T	T	T	T	(E1)S	T	T	T	(E3)S
11	T	T	T	T	T	T	T	T	T	T	T	T	T	(E4)S
12	T	T	T	D	T	T	T	T	T	T	(E1)S	T	-	T
13	T	T	T	D	T	T	T	T	T	T	(E2)S	T	T	D
14	T	T	T	D	T	T	T	T	T	T	(E3)S	(E4)S	T	D
15	T	T	T	D	T	T	T	T	T	T	(E4)S	(E3)S	T	D

Trap	Set 6	7	14	19	30	33	37	42	47	61	65	70	76	86
16	T	T	T	T	T	T	T	T	T	(E4)S	T	(E2)S	T	T
17	T	T	T	T	T	T	T	T	T	(E3)S	T	(E1)S	T	D
18	T	T	T	D	T	T	T	T	T	(E2)S	T	T	T	(E4)S
19	T	T	T	D	T	-	T	T	D	(E1)S	T	T	T	(E3)S
20	(E4)S	T	T	D	T	T	T	(E4)S	D	T	T	T	T	(E2)S
21	(E3)S	(E4)S	(E4)S	(E4)S	(E4)D	(E4)-	(E4)S	(E3)S	(E4)S	T	T	T	(E4)S	(E1)S
22	(E2)S	(E3)S	(E3)S	(E3)S	(E3)D	(E3)-	(E3)S	(E2)S	(E3)S	-	T	T	(E3)S	T
23	(E1)S	(E2)S	(E2)S	(E2)S	(E2)D	(E2)S	(E2)S	(E1)S	(E2)S	T	T	(E1)S	(E2)S	T
24	T	(E1)S	(E1)S	(E1)S	(E1)D	(E1)S	(E1)S	T	(E1)S	T	T	(E2)S	(E1)S	D
25	T	T	T	T	T	T	D	T	T	T	T	(E3)S	T	T
26	T	T	T	T	T	T	T	T	T	(E4)S	T	(E4)S	T	T
27	T	T	T	D	T	T	D	T	D	(E3)S	(E1)S	T	T	T
28	T	T	T	D	T	T	T	T	T	(E2)S	(E2)S	T	T	(E2)S
29	T	T	T	T	T	T	-	T	D	(E1)S	(E3)S	T	T	(E3)S
30	D	T	T	T	D	T	T	T	T	T	(E4)S	T	T	(E4)S
31	D	T	T	D	-	T	T	T	D	T	T	T	T	(E1)S
32	D	T	T	D	D	T	D	T	T	T	T	(E4)D	T	T
33	D	T	T	D	D	T	T	T	D	T	T	(E3)D	T	T
34	(E4)D	T	T	D	D	T	T	T	D	-	T	(E2)D	T	T
35	(E3)D	T	(E4)S	D	D	T	T	(E4)S	(E4)S	-	T	(E1)T	T	T
36	(E2)D	(E4)S	(E3)S	(E4)D	D	(E4)S	(E4)S	(E3)S	(E3)S	(E4)D	T	T	(E1)S	T
37	(E1)D	(E3)S	(E2)S	(E3)D	(E4)S	(E3)S	(E3)S	(E2)S	(E2)S	(E3)D	T	T	(E2)S	T
38	D	(E2)S	(E1)S	(E2)D	(E3)S	(E2)S	(E2)S	(E1)S	(E1)S	(E2)D	T	T	(E3)S	
39	D	(E1)S	T	(E1)D	(E2)S	(E1)S	(E1)S	T	T	(E1)D	T	-	(E4)S	
40	D	T	T	D	(E1)S	T	T	T	D	T	T	T	T	
41	D	T	T	D	D	-	T	T	D	T	T		T	
42	D	T	T	D	D	T	T	T	D	T	(E1)T		T	
43	D	T	T	D	D	T	T	T	T	D	(E2)D		T	
44	D	T	T	D	D	T	T	T	D	T	(E3)D		T	
45	D	T	T	D	D	T	D	T	T	D	(E4)-		T	
46	D	T	T	D	D	T	D	T	D		T		T	
47	D	T	T	D	D	T	D	T	D		T		T	

	Set													
Trap	**6**	**7**	**14**	**19**	**30**	**33**	**37**	**42**	**47**	**61**	**65**	**70**	**76**	**86**
48	(E4)D	T	T	D	D	T	T	-	D		T		T	
49	(E3)D	T	T	D	D	T	D	T	D		T		T	
50	(E2)D	T	T	D	(E4)S	T	D	(E4)D	T		T		T	
51	(E1)D	(E4)S	(E4)D	(E4)D	(E3)S	(E4)D	(E4)D	(E3)D	(E4)D		T		(E4)S	
52	D	(E3)S	(E3)D	(E3)D	(E2)S	(E3)D	(E3)D	(E2)D	(E3)D		T		(E3)S	
53	D	(E2)S	(E2)D	(E2)D	(E1)S	(E2)D	(E2)D	(E1)D	(E2)D		T		(E2)-	
54	D	(E1)S	(E1)D	(E1)D	D	(E1)D	(E1)D	T	(E1)D		T		(E1)S	
55	D	T	T	D	D	T	D	T	D		T		T	
56	D	T	T	D	D	T	D	T	D		T		T	
57	D	T	T	D	D	T	D	T	D		T		T	
58	D	-	T	D	D	T	D	T	D		T		T	
59	D	T	T	D	D	T	-	T	D		T		T	
60	D	T	T	D	D	T	D	T	D		T		T	
61	D	T	T	D	D	T	D	T	D		T		-	
62		T	T	D	D	T	D	T	D		T		T	
63		T	D	D	D	T	D	T	D		T		T	
64		T	D	D	-	T	D	T	D		T		T	
65		T	T	D	D	T	D		D		T		T	
Totals														
-		3			2	4	2	1		3	1	1	3	
D	32		6	44	30	4	22	4	30	6	2	3	1	5
E1 S	2	4	3	2	3	3	3	3	3	3	2	3	4	3
E2 S	2	4	3	2	3	3	3	3	3	3	2	3	3	3
E3 S	2	4	3	2	3	2	3	3	3	3	2	3	4	3
E4 S	2	4	3	2	3	2	3	3	3	3	2	3	4	3
T	21	46	47	13	21	47	29	47	23	24	52	24	46	19

APPENDIX I DETAILS ON SABLEFISH CATCH AND NUMBERS RECOVERED, SAMPLED AND TAGGED DURING THE 2005 STANDARDIZED CHARTER (F/V PACIFIC VIKING)

	Catch		Number		Number sampled for					Proportion	Mean fork length (mm)		
Set	Weight (kg)	Count	Recovered	Tagged	Fork length	Sex	Maturity	Otoliths	Weight	males	Males	Females	Tagged
1	80	23	0	0	23	23	23	23	23	0.17	621	698	
2	415	133	0	0	130	130	130	47	47	0.28	611	658	
3	844	272	0	0	125	125	125	46	46	0.42	609	665	
4	478	164	0	0	122	122	122	50	50	0.36	591	674	
5	298	111	2	0	113	113	113	46	46	0.49	571	662	
6	509	195	2	0	146	146	146	53	53	0.38	566	649	
7	214	75	2	0	73	73	73	49	49	0.12	598	640	
8	129	31	0	0	30	30	30	23	23	0.10	656	735	
9	241	74	0	0	76	76	76	51	51	0.09	608	665	
10	284	109	1	0	109	109	109	52	52	0.43	567	654	
11	145	75	0	0	75	75	75	56	56	0.72	544	613	
12	261	120	1	0	122	122	122	52	52	0.67	562	627	
13	390	138	0	0	136	136	136	53	53	0.41	598	666	
14	481	169	0	0	129	129	129	48	48	0.36	600	656	
15	17	4	0	0	4	4	4	4	4	0.00		698	
16	7	2	1	0	2	2	2	2	2	1.00	574		
17	213	63	0	0	62	64	64	50	50	0.28	597	672	
18	527	172	0	0	130	130	130	46	46	0.30	629	657	
19	1071	401	0	0	168	168	168	65	65	0.46	593	643	
20	137	63	0	0	63	63	63	45	45	0.57	553	620	
21	86	35	0	0	35	35	35	35	35	0.54	576	640	
22	47	18	0	0	17	17	17	17	17	0.41	620	656	
23	159	28	0	0	27	27	27	21	21	0.00		805	
24	354	114	0	0	114	114	114	55	55	0.28	605	686	
25	254	118	2	0	121	121	121	49	49	0.64	564	622	
26	1160	573	0	0	132	132	132	51	51	0.71	556	605	
27	574	203	0	0	129	129	129	51	51	0.49	608	663	
28	456	158	1	0	131	131	131	52	52	0.32	596	659	
29	49	13	0	0	13	13	13	13	13	0.15	684	706	
30	413	137	1	0	122	122	122	50	50	0.19	598	662	

	Catch		Number		Number sampled for					Proportion	Mean fork length (mm)		
Set	Weight (kg)	Count	Recovered	Tagged	Fork length	Sex	Maturity	Otoliths	Weight	males	Males	Females	Tagged
31	813	293	2	0	132	132	132	46	46	0.39	600	663	
32	1405	550	1	0	126	126	126	49	49	0.63	591	642	
33	744	289	1	0	126	126	126	50	50	0.51	587	651	
34	375	169	0	0	132	132	132	50	50	0.60	564	629	
35	119	34	0	0	35	35	35	26	26	0.26	642	693	
36	122	35	0	0	35	35	35	35	35	0.14	626	690	
37	83	20	0	0	20	20	20	20	20	0.10	640	735	
38	47	16	0	0	16	16	16	16	16	0.38	618	660	
39	342	114	0	0	114	114	114	52	52	0.39	610	664	
40	763	327	1	0	137	137	137	55	55	0.53	570	639	
41	875	312	3	0	129	129	129	54	54	0.42	595	667	
42	987	315	3	0	137	137	137	52	52	0.26	605	671	
43	17	5	0	0	5	5	5	5	5	0.20	492	701	
44	37	10	0	0	10	10	10	10	10	0.30	586	702	
45	968	301	2	0	166	165	165	51	51	0.32	624	676	
46	724	253	0	0	130	130	130	53	53	0.38	600	660	
47	1027	424	2	0	128	128	127	52	52	0.55	590	658	
48	79	25	0	0	25	25	25	25	25	0.48	612	691	
49	76	26	0	0	27	27	27	27	27	0.67	618	688	
50	72	22	0	0	22	22	22	22	22	0.23	621	685	
51	28	7	0	0	7	7	7	7	7	0.29	686	752	
52	84	33	0	0	32	32	32	32	32	0.44	576	665	
53	178	56	0	0	56	56	56	42	42	0.27	594	669	
54	971	417	1	0	133	132	133	52	52	0.43	568	609	
55	780	316	0	0	139	139	139	51	51	0.37	584	622	
56	631	218	0	0	130	130	130	54	54	0.15	599	652	
57	7	2	0	0	2	2	2	2	2	0.00		682	
58	49	13	0	0	13	13	13	13	13	0.31	689	725	
59	27	8	0	0	8	8	8	8	8	0.38	657	676	
60	39	13	0	0	13	13	13	13	13	0.54	604	689	
61	397	148	0	0	128	128	128	49	49	0.41	580	637	
62	220	73	0	0	75	75	75	51	51	0.39	602	657	
63	129	37	0	0	37	37	37	37	37	0.11	598	668	

	Catch		Number		Number sampled for					Proportion	Mean fork length (mm)		
Set	Weight (kg)	Count	Recovered	Tagged	Fork length	Sex	Maturity	Otoliths	Weight	males	Males	Females	Tagged
64	36	8	0	0	9	9	9	9	9	0.00		736	
65	24	16	0	5	11	11	11	11	11	0.45	526	508	521
66	112	77	0	52	26	26	26	26	26	0.42	545	514	502
67	340	164	0	83	52	52	52	52	52	0.50	560	587	572
68	938	389	2	172	47	47	47	47	47	0.36	576	615	596
69	2139	692	3	307	70	70	70	70	70	0.14	575	640	636
70	1352	473	1	250	46	46	46	46	46	0.46	602	648	621
71	1454	497	1	240	52	52	52	52	52	0.52	594	648	627
72	1198	377	0	176	52	52	52	52	52	0.33	605	660	636
73	1209	423	6	213	46	46	46	46	46	0.43	564	642	620
74	1535	534	5	251	51	51	51	51	51	0.25	604	661	613
75	1176	457	4	219	51	51	51	51	51	0.29	574	617	610
76	1204	470	9	241	50	50	50	50	50	0.32	586	622	613
77	1010	368	7	200	51	51	51	51	51	0.25	566	628	626
78	1332	469	4	265	56	56	56	56	56	0.38	601	665	627
79	1303	424	10	221	56	56	56	56	56	0.13	599	651	637
80	199	88	0	51	38	38	38	38	38	0.53	553	602	583
81	244	115	3	79	35	35	35	35	35	0.46	542	588	580
82	649	269	5	133	53	53	53	53	53	0.32	546	623	586
83	924	426	10	204	49	49	49	49	49	0.39	542	598	571
84	752	337	9	101	45	45	45	45	45	0.11	549	597	580

APPENDIX J DETAILS ON SABLEFISH CATCH AND NUMBERS RECOVERED, SAMPLED AND TAGGED DURING THE 2005 TAGGING CHARTER (F/V VIKING SUNRISE).

	Catch		Number		Number sampled for						Proportion	Mean fork length (mm)		
Set	Weight (kg)	Count	Recovered	Tagged	Fork length	Sex	Maturity	Otoliths	Weight	Girth	males	Males	Females	Tagged
1	224	94	0	20	35	35	34	35	35	0	0.46	610	675	618
2	785	363	3	141	47	47	47	47	47	0	0.72	553	645	585
3	1540	628	0	170	87	87	87	87	87	0	0.69	559	641	607
4	690	359	0	110	46	46	45	46	46	0	0.87	541	603	570
5	861	341	0	138	56	56	56	56	56	0	0.25	573	631	598
6	3119	1127	4	470	151	151	151	0	0	150	0.68	612	689	622
7	2048	696	1	551	137	137	137	0	0	137	0.51	633	696	632
8	1645	611	0	189	44	44	44	44	44	0	0.52	613	644	625
9	565	206	1	65	55	55	54	55	54	0	0.11	601	635	627
10	463	203	1	56	64	64	64	64	0	0	0.36	552	604	594
11	1552	597	2	180	52	52	52	52	0	0	0.54	577	655	613
12	442	141	1	34	27	27	27	27	27	0	0.00		672	668
13	965	508	9	178	62	62	62	62	62	0	0.74	555	570	569
14	3625	1386	27	970	156	156	156	0	0	156	0.42	601	667	613
15	572	230	0	57	55	55	55	55	55	0	0.27	551	634	626
16	1230	469	1	172	39	39	39	39	39	0	0.33	587	649	623
17	627	282	0	68	51	51	51	51	51	0	0.57	564	617	601
18	907	295	1	130	43	43	43	43	43	0	0.21	615	678	656
19	3662	1264	4	311	161	161	161	0	0	161	0.46	612	665	634
20	318	92	0	17	52	52	52	52	51	0	0.04	645	674	697
21	548	204	1	73	49	49	49	49	49	0	0.20	612	613	630
22	477	207	2	55	52	52	52	52	52	0	0.67	558	661	599
23	474	216	0	68	51	51	51	51	51	0	0.63	549	612	580
24	764	289	1	77	52	52	52	52	0	0	0.77	608	660	629
25	716	317	1	100	53	53	53	53	0	0	0.68	576	654	597
26	723	262	0	85	55	55	55	55	0	0	0.69	614	678	640
27	617	175	0	49	53	53	53	53	53	0	0.25	614	683	681
28	569	249	0	75	54	54	54	54	0	0	0.74	578	616	591
29	946	319	0	87	52	52	52	52	52	0	0.10	630	668	652

	Catch		Number		Number sampled for						Proportion	Mean fork length (mm)		
Set	Weight (kg)	Count	Recovered	Tagged	Fork length	Sex	Maturity	Otoliths	Weight	Girth	males	Males	Females	Tagged
30	2735	1042	2	333	183	183	183	0	0	183	0.46	606	656	617
31	144	38	0	22	11	11	11	11	0	0	0.09	601	708	689
32	1200	405	2	122	49	49	49	49	49	0	0.45	613	661	638
33	3048	1046	4	823	107	108	108	0	0	108	0.40	637	659	645
34	866	310	2	97	50	49	48	50	50	0	0.57	616	687	637
35	176	57	0	0	10	10	9	10	0	0	0.00		672	
36	1478	534	0	195	51	51	51	51	0	0	0.80	620	689	634
37	2151	782	2	318	114	113	113	0	0	113	0.34	625	690	632
38	54	19	0	0	19	19	13	19	0	0	0.11	636	696	
39	604	231	0	55	58	58	57	58	57	0	0.34	612	665	636
40	782	202	0	72	50	50	49	50	0	0	0.14	658	718	714
41	932	294	0	91	50	50	50	50	0	0	0.42	623	698	649
42	2412	1059	16	889	132	132	132	0	0	131	0.58	581	657	592
43	293	72	0	27	40	40	40	40	40	0	0.00		699	725
44	811	330	1	89	60	60	60	60	60	0	0.40	579	650	610
45	1474	653	1	204	50	50	50	50	0	0	0.62	571	606	595
46	262	76	1	21	46	46	46	46	0	0	0.15	625	694	671
47	2684	1037	4	295	120	120	120	0	0	120	0.60	618	685	622
48	790	287	0	86	54	54	54	54	0	0	0.57	605	646	637
49	707	202	0	52	68	68	68	68	0	0	0.46	649	708	693
50	1573	753	2	283	46	46	46	46	46	0	0.67	575	639	575
51	1100	447	3	177	45	45	45	45	44	0	0.71	590	666	605
52	356	98	0	30	50	50	50	50	19	0	0.18	615	679	673
53	98	24	0	12	11	11	11	11	0	0	0.00		684	715
54	235	77	1	26	26	26	26	26	26	0	0.46	618	698	632
55	38	12	0	3	6	6	6	6	0	0	0.17	516	607	687
56	919	306	0	84	55	55	55	55	55	0	0.29	598	664	634
57	1546	505	1	208	51	51	51	51	51	0	0.67	624	677	654
58	341	75	0	23	51	51	51	51	51	0	0.12	644	741	727
59	76	21	0	11	10	10	10	10	10	0	0.60	621	685	663
60	1164	461	3	167	47	47	47	47	46	0	0.72	605	622	609
61	1467	470	2	317	95	95	95	0	0	95	0.33	608	670	641
62	1519	379	0	137	62	62	62	62	62	0	0.39	609	686	650

	Catch		Number		Number sampled for						Proportion	Mean fork length (mm)		
Set	Weight (kg)	Count	Recovered	Tagged	Fork length	Sex	Maturity	Otoliths	Weight	Girth	males	Males	Females	Tagged
63	62	14	0	8	8	8	8	8	0	0	0.13	695	737	650
64	546	126	0	34	56	56	56	56	0	0	0.23	692	744	714
65	2967	1055	1	905	130	130	129	0	0	129	0.32	596	661	629
66	122	31	0	2	26	26	26	26	0	0	0.19	657	701	708
67	948	370	2	135	46	46	46	46	46	0	0.61	592	654	624
68	278	77	0	29	35	35	35	35	35	0	0.20	655	698	696
69	532	213	3	66	50	50	50	50	50	0	0.70	588	690	619
70	1337	520	1	334	150	150	150	0	0	150	0.37	583	660	607
71	13	5	0	2	2	2	2	2	0	0	0.00		686	682
72	243	94	1	34	49	49	49	49	44	0	0.55	586	655	636
73	226	69	1	21	33	33	33	33	0	0	0.45	618	691	663
74	759	418	5	154	57	56	56	57	0	0	0.73	536	610	551
75	328	174	9	82	50	52	52	52	13	0	0.87	542	562	561
76	1882	634	6	507	128	128	128	0	0	127	0.32	599	646	636
77	817	271	0	101	52	52	52	52	52	0	0.56	584	673	635
78	235	84	0	37	47	47	47	47	47	0	0.55	637	668	634
79	829	328	0	99	49	49	49	49	49	0	0.53	578	646	616
80	126	33	0	7	25	25	25	25	0	0	0.24	609	671	740
81	316	126	0	26	57	57	57	57	27	0	0.61	568	612	592
82	26	4	0	2	2	2	2	2	0	0	0.00		894	724
83	5	1	0	0	1	1	1	1	0	0	0.00		748	
84	509	161	0	46	50	50	50	50	50	0	0.54	609	679	656
85	222	71	0	19	49	49	49	49	49	0	0.47	622	684	654
86	1393	467	2	242	123	123	123	0	0	123	0.45	608	669	632
87	222	73	0	20	40	40	40	40	0	0	0.58	616	658	649
88	1077	396	0	140	56	56	56	56	13	0	0.59	593	641	614

APPENDIX K. ESCAPE RING STUDY DETAILS

Table K.1 Details on the sablefish catch of escape ring study sets. For each set and treatment, the numbers of traps deployed as well as the number selected for analyses are shown. The total and average trap catch data are summarised for all traps deployed.

			Traps		Total Catch (all traps)		Average Catch (all traps)	
Locality	**Set**	**Treatment**	**Deployed**	**Selected**	**Weight (kg)**	**Count**	**Weight (kg)**	**Count**
Langara Island-North Frederick	86	E1	3	3	62.2	19	20.7	6.3
		E2	3	1	107.4	39	35.8	13
		E3	3	3	123	38	41	12.7
		E4	3	3	91	25	30.3	8.3
		Tagging	24	24	1009.5	346	42.1	14.4
Hippa Island	76	E1	4	4	114.5	39	28.6	9.8
		E2	4	4	56.4	19	14.1	4.8
		E3	4	4	88	31	22	7.8
		E4	4	3	118.2	37	29.6	9.2
		Tagging	49	45	1505.4	508	30.7	10.4
Buck Point	70	E1	4	3	144.8	54	36.2	13.5
		E2	4	4	175.9	60	44	15
		E3	4	4	139.2	47	34.8	11.8
		E4	4	4	90	31	22.5	7.8
		Tagging	24	16	787.5	328	32.8	13.7
Tasu Sound	65	E1	3	3	161.8	52	53.9	17.3
		E2	3	2	127.6	39	42.5	13
		E3	3	3	106.7	38	35.6	12.7
		E4	3	0	97.3	32	32.4	10.7
		Tagging	51	43	2473.2	894	48.5	17.5
Gowgaia Bay	61	E1	4	4	184.2	57	46	14.2
		E2	4	3	52.2	14	13	3.5
		E3	4	4	88.1	27	22	6.8
		E4	4	2	66.4	20	16.6	5
		Tagging	29	29	1076.2	352	37.1	12.1
Cape St. James	47	E1	4	4	188.7	70	47.2	17.5

Locality	Set	Treatment	Traps		Total Catch (all traps)		Average Catch (all traps)	
			Deployed	Selected	Weight (kg)	Count	Weight (kg)	Count
		E2	4	2	128.7	45	32.2	11.2
		E3	4	4	97.2	33	24.3	8.2
		E4	4	3	132.4	43	33.1	10.8
		Tagging	49	47	2137.3	846	43.6	17.3
Middle Ground	42	E1	4	4	135.1	61	33.8	15.2
		E2	4	3	77.7	32	19.4	8
		E3	4	4	154.4	59	38.6	14.8
		E4	4	4	56.3	18	14.1	4.5
		Tagging	48	46	1988	924	41.4	19.2
Triangle Island	37	E1	4	4	96.5	32	24.1	8
		E2	4	4	157.3	50	39.3	12.5
		E3	4	4	144.3	43	36.1	10.8
		E4	4	4	63.1	19	15.8	4.8
		Tagging	49	48	1689.9	638	34.5	13
Pisces Canyon	33	E1	4	4	197.7	70	49.4	17.5
		E2	4	3	103.9	31	26	7.8
		E3	4	4	109.5	35	27.4	8.8
		E4	4	3	88.8	28	22.2	7
		Tagging	49	48	2547.7	882	52	18
Quatsino Sound	30	E1	4	3	183.3	82	45.8	20.5
		E2	4	3	197.3	68	49.3	17
		E3	4	4	102.5	39	25.6	9.8
		E4	4	4	151.3	47	37.8	11.8
		Tagging	49	48	2100.5	806	42.9	16.4
Esperanza Inlet	19	E1	4	4	192.4	65	48.1	16.2
		E2	4	0	175.7	58	43.9	14.5
		E3	4	4	260.6	85	65.1	21.2
		E4	4	3	110	31	27.5	7.8
		Tagging	49	40	2923.5	1025	59.7	20.9
Estevan Point	14	E1	4	4	162.7	60	40.7	15
		E2	4	0	227.7	76	56.9	19

Locality	Set	Treatment	Traps		Total Catch (all traps)		Average Catch (all traps)	
			Deployed	Selected	Weight (kg)	Count	Weight (kg)	Count
		E4	4	4	137.1	42	34.3	10.5
		Tagging	49	49	2925.6	1148	59.7	23.4
Father Charles Canyon	7	E1	4	4	100.3	32	25.1	8
		E2	4	0	96.5	30	24.1	7.5
		E3	4	4	100.2	32	25	8
		E4	4	3	162.9	43	40.7	10.8
		Tagging	49	46	1588.4	559	32.4	11.4
Barkley Canyon	6	E1	4	4	188.8	67	47.2	16.8
		E2	4	0	198.4	71	49.6	17.8
		E3	4	4	257.5	84	64.4	21
		E4	4	4	139.8	41	35	10.2
		Tagging	45	45	2334.1	864	51.9	19.2

Table K 2. Details on the number of traps and sablefish sampled by treatment and set as part of the escape ring study.

Locality	Treatment	Traps sampled	Number of sablefish sampled for				
			Fork length	Sex	Maturity	Girth	Total
Langara Island-North Frederick	Tagging	24	242	0	0	0	242
	E1	3	21	21	21	21	21
	E2	3	39	39	39	39	39
	E3	3	38	38	38	38	38
	E4	3	25	25	25	25	25
Hippa Island	Tagging	47	507	0	0	0	507
	E1	4	41	41	41	41	41
	E2	4	19	19	19	19	19
	E3	4	31	31	31	31	31
	E4	4	37	37	37	36	37
Buck Point	Tagging	23	333	0	0	0	334
	E1	3	44	44	44	44	44
	E2	3	46	46	46	46	46
	E3	3	38	38	38	38	38
	E4	3	22	22	22	22	22
Tasu Sound	Tagging	51	902	0	0	0	905
	E1	2	40	40	40	40	40
	E2	2	27	27	26	26	27
	E3	2	31	31	31	31	31
	E4	2	32	32	32	32	32
Gowgaia Bay	Tagging	26	317	0	0	0	317
	E1	3	50	50	50	50	50
	E2	3	6	6	6	6	6
	E3	3	23	23	23	23	23
	E4	3	16	16	16	16	16
Cape St. James	Tagging	49	295	0	0	0	295
	E1	3	42	42	42	42	42
	E2	3	32	32	32	32	32

Locality	Treatment	Traps sampled	Number of sablefish sampled for				
			Fork length	Sex	Maturity	Girth	Total
	E3	3	19	19	19	19	19
	E4	3	27	27	27	27	27
Middle Ground	Tagging	47	889	0	0	0	889
	E1	3	54	54	54	54	54
	E2	3	18	18	18	18	18
	E3	3	45	45	45	44	45
	E4	3	15	15	15	15	15
Triangle Island	Tagging	47	318	0	0	0	318
	E1	3	26	26	26	26	26
	E2	3	40	39	39	39	40
	E3	3	32	32	32	32	32
	E4	3	16	16	16	16	16
Pisces Canyon	Tagging	47	823	0	0	0	823
	E1	3	52	53	53	53	53
	E2	3	20	20	20	20	20
	E3	3	19	19	19	19	19
	E4	3	16	16	16	16	16
Quatsino Sound	Tagging	47	333	0	0	0	333
	E1	3	50	50	50	50	50
	E2	3	51	51	51	51	51
	E3	3	41	41	41	41	41
	E4	3	41	41	41	41	41
Esperanza Inlet	Tagging	49	311	0	0	0	311
	E1	2	48	48	48	48	48
	E2	2	41	41	41	41	41
	E3	2	55	55	55	55	55
	E4	2	17	17	17	17	17
Estevan Point	Tagging	49	969	0	0	0	970
	E1	3	43	43	43	43	43

Locality	Treatment	Traps sampled	Number of sablefish sampled for				
			Fork length	Sex	Maturity	Girth	Total
	E2	3	40	40	40	40	40
	E3	3	41	41	41	41	41
	E4	3	32	32	32	32	32
Father Charles Canyon	Tagging	46	551	0	0	0	551
	E1	4	31	31	31	31	31
	E2	4	30	30	30	30	30
	E3	4	32	32	32	32	32
	E4	4	44	44	44	44	44
Barkley Canyon	Tagging	45	470	0	0	0	470
	E1	2	41	41	41	41	41
	E2	2	39	39	39	38	39
	E3	2	55	55	55	55	55
	E4	2	16	16	16	16	16

Table K 3. Summary statistics for biological data collected from sablefish sampled as part of the escape ring study. The sex ratio (proportion of males) and the mean fork length and girth by sex is listed for each treatment and set.

			Mean fork length (mm)			Mean girth (mm)		
Locality	**Treatment**	**Proportion males**	**Males**	**Females**	**Overall**	**Males**	**Females**	**Overall**
Langara Island-North Frederick	Tagging				632			
	E1	0.43	613	644	631	327	337	333
	E2	0.56	591	651	617	309	340	322
	E3	0.39	618	677	654	323	344	336
	E4	0.36	625	697	671	335	366	355
Hippa Island	Tagging				636			
	E1	0.34	596	628	617	309	326	320
	E2	0.26	586	648	632	295	338	326
	E3	0.42	605	641	626	317	331	325
	E4	0.24	603	665	650	308	342	334
Buck Point	Tagging				607			
	E1	0.41	574	645	616	275	319	301
	E2	0.37	593	651	629	306	336	325
	E3	0.29	588	682	655	298	350	335
	E4	0.45	575	664	624	292	337	316
Tasu Sound	Tagging				629			
	E1	0.35	592	664	639	289	329	315
	E2	0.30	588	671	649	293	336	326
	E3	0.26	590	651	635	292	320	313
	E4	0.34	613	657	642	304	325	318
Gowgaia Bay	Tagging				641			
	E1	0.38	601	679	650	304	345	329
	E2	0.17	580	682	665	301	366	355
	E3	0.39	633	650	643	313	321	318
	E4	0.13	576	668	656	327	341	340
Cape St. James	Tagging				622			
	E1	0.55	598	689	639	297	347	320

	E2	0.66	623	663	637	314	331	320
	E3	0.63	617	680	641	301	338	314
	E4	0.59	638	702	664	316	343	327
Middle Ground	Tagging				592			
	E1	0.72	572	645	592	288	330	300
	E2	0.56	597	633	613	317	318	318
	E3	0.49	588	659	625	304	337	320
	E4	0.33	594	687	656	333	392	372
Triangle Island	Tagging				632			
	E1	0.42	602	685	650	310	351	334
	E2	0.36	622	675	657	319	341	333
	E3	0.25	652	700	688	329	354	348
	E4	0.31	643	709	688	333	353	347
Pisces Canyon	Tagging				645			
	E1	0.43	626	647	638	305	329	319
	E2	0.45	664	682	673	334	350	343
	E3	0.21	624	661	654	314	332	329
	E4	0.44	643	670	658	320	339	331
Quatsino Sound	Tagging				617			
	E1	0.56	584	651	614	294	330	310
	E2	0.37	610	658	640	306	337	326
	E3	0.56	619	642	629	309	332	319
	E4	0.34	621	666	651	323	336	331
Esperanza Inlet	Tagging				634			
	E1	0.60	613	668	635	315	348	328
	E2	0.39	631	652	643	323	335	330
	E3	0.42	597	660	634	309	338	326
	E4	0.35	614	700	670	320	366	350
Estevan Point	Tagging				613			
	E1	0.47	575	668	625	298	341	321
	E2	0.43	616	667	645	337	347	343

	E3	0.49	604	659	632	321	363	343
	E4	0.28	622	676	661	344	377	368
Father Charles Canyon	Tagging				632			
	E1	0.45	605	697	655	301	345	325
	E2	0.67	634	690	652	319	349	329
	E3	0.50	632	673	653	323	339	331
	E4	0.45	652	713	686	336	367	353
Barkley Canyon	Tagging				622			
	E1	0.68	593	695	626	325	374	341
	E2	0.67	611	671	631	327	360	338
	E3	0.69	617	689	639	342	365	349
	E4	0.63	643	711	668	366	384	373

APPENDIX L TRAP GEAR GLOSSARY

Anchor: Bundle of chains weighing approximately 60 kg (90 lb) that is attached to the groundline on the becket before the first trap and after the last trap. The anchors prevent drifting and sliding of the groundline.

Anchorline or buoyline: A 549 m (300 fm) long 22 mm (7/8 in.) 3-ply polypropylene rope permanently attached to the groundline at the first and last becket. This line retrieves the anchor and groundline.

Baitbag: 15 x 20 cm (6 x 8 in.) 3.175 mm (1/8 in.) mesh bag with a nylon drawstring and no. 72 stainless steel halibut longline snap.

Becket: 13 mm ($^1/_2$ in.) diameter two-in-one braided nylon rope spliced into the groundline every 46 m (150 ft). Each becket forms a loop of approximately 15 cm (6 in.).

Buoy: 60 to 90 cm (2 to 3 ft) diameter Bright orange inflatable plastic bladders used in combinations of two or three to suspend the sinkerline and buoyline.

Bridle: 13 mm ($^1/_2$ in.) 3-ply polypropylene rope "double" fastened at three points to the top hoop of the trap and knotted at a single point to form a loop of approximately 158 cm (62 in.) long with a snap bent on to the end. This bridle is fastened onto the top hoop in such a manner that pressure is inward on the tunnel when the trap is being retrieved.

Drum: Large capacity spool or drum that stores 3 to 5 complete anchor and groundline combinations.

Escape panel: 12 meshes of the trap web located in the upper half of one of the panels opposite the tunnel and cut along the horizontal bar to make a triangular opening of approximately 25 cm (10 in.) when allowed to hang loose. The cut is laced closed with a single piece of 2 mm cotton "butcher" twine. The purpose of the panel is to create an opening when the cotton twine rots if the trap is lost while fishing, i.e., to prevent ghost-fishing.

Flagpole: Attached to buoys and helps to locate the end of the string.

Groundline: 22 mm (7/8 in.) 3 ply polypropylene rope of various lengths depending on the depth of the set.

Hauler or power block: Hydraulic powered pulley that hauls all the line at approximately 30 m (100 ft) per minute aboard the vessel prior to winding or storing on the drum.

Ring: 52 mm (2 in.) diameter 8 mm (5/16 in.) stainless steel ring bent or knotted onto becket.

Shotline: Additional pieces of 22 mm (7/8 in.) polypropylene rope used to extend the anchor or buoyline, usually 91 m (50 fm) or 183 m (100 fm) long.

Sinkerline: 19 mm (3/4 in.) 3-ply nylon rope attached to the top of the buoyline or shotlines. The purpose of this line is to prevent the polypropylene anchor or buoyline from floating and "puddling" on the surface and posing a hazard to navigation. The line is usually 91 m (50 fm) or 183 m (100 fm) long.

Snap: Galvanised cast steel device with ring on one end and a spring loaded enclosure on the other end strong enough to withstand a 1400 kg (3000 lb) strain.

Traps: The traps are a Korean design adopted and modified by local fishers to local conditions. They are designed and constructed to stack into each other when transported or stored. The traps are constructed of mild steel rod welded at all junctures. The top hoop diameter is 84 cm (33 in.), the bottom hoop diameter is 137.2 cm (54 in.), and the 6 vertical members are 79 cm (31 in.) long giving the trap a 74 cm (29 in.) vertical height. Horizontal bars are attached midway between the top and bottom hoops in 5 of the 6 vertical panels. The trap is covered or caped with a single piece of black nylon #48 thread 70 mm web (measured inside the knots when the web is stretched flat). This is fastened to the frame so that the top is permanently closed and the bottom can be opened and closed with a draw string. The one side panel without a horizontal bar is not covered with web and accommodates the trap entrance or tunnel. The tunnel is constructed of two pieces of green 44 mm (#18) knotless braided web. The two seams of the tunnel are fastened together prior to attaching to the frame of the trap. When the tunnel is fastened to the trap it slopes downward with a 36 cm (14 in.) opening or slit. The bottom part of the slit will be taut and the top will be loose when the tunnel is stretched into place from the opposite panel of the trap. The tunnel extends 64 cm (25 in.) into the trap. When the trap is prepared for fishing both the tunnel lines and the bottom closing line (4 mm braided single-ply polypropylene twine) are pulled taut, looped together and knotted at a single point. The tunnel and bottom closing lines are of sufficient length to allow the bottom and the tunnel to collapse completely against the inside of the trap to allow for stacking. One of the panels opposite the tunnel contains the escape panel (defined above). Chafing line (10 mm ($^3/_8$ in.) and 13 mm ($^1/_2$ in.) diameter ر-ply polypropylene) is wrapped around all the frame members to protect the web after the trap is covered.

(Descriptions were modified from Smith et al. 1996)